The development of a physiotherapist-led pain management programme for low back pain in Bahrain

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This thesis is dedicated to Bahrain

تبين عيني.. لچ عيوني.. أنا و كل ما أملك.. فدا أرضچ

يا دانة كل مداينها.. أهي مني و أنا منها..
يا شوق إللي إذا أبعد يناديني..

يقول أنت عزيز الراس.. و أهلك من أعز الناس
يقول أنت بحريني .. يقول أنت بحريني

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Abstract

Background: Low back pain (LBP) is associated with pain-related beliefs, coping strategies and anxiety and depression. Culture is known to affect the pain experience through language, beliefs, and attitudes. Most investigations into the effectiveness of pain management programmes (PMP) that aim to reduce emotional distress and unhelpful beliefs, encourage activity and participation and promote long-term self-management have been carried out in Western countries. This has implications for implementing PMPs for LBP in Bahrain.

Methods: Five studies were conducted: 1) a systematic review of studies assessing for determinants and predictors of self-reported LBP disability in non-Western cultures. In Bahrain 2) translation, cross-cultural adaptation and psychometric testing of the Roland-Morris Disability Questionnaire (RMDQ), Back Beliefs Questionnaire (BBQ) and Pain Coping Strategies Questionnaire (CSQ); 3) a cross-sectional survey of factors associated with LBP disability; and 4) a qualitative exploration of beliefs and experiences of patients living with LBP were carried out to inform 5) feasibility and acceptability testing of a physiotherapist-led PMP.

Results: 1) The systematic review identified 12 studies from eight non-Western countries. Evidence was strong for fear-avoidance beliefs having a low association with LBP disability. Evidence was moderate for a moderate association between LBP disability and pain intensity, and no association with symptom duration. 2) The translated and cross-culturally adapted Arabic RMDQ, BBQ and CSQ were comprehensible, acceptable, valid and reliable self-report outcome measures. Their psychometric properties were comparable to other versions. 3) The cross-sectional survey (n=199) showed age, gender, pain intensity, back pain-related beliefs, fear-avoidance beliefs, ability to ignore pain, control pain and decrease pain, depression and anxiety explained 34.7% of the variance in LBP. 4) Five themes emerged from the qualitative study (n=18); i) loss of independence and change of identity causes distress; ii) beliefs and attitudes towards low back pain; iii) trying to cope with LBP; iv) experiences within the healthcare system; and v) participants' assessments of their needs. 5) Feasibility testing of the PMP (n=23) showed 16 participants completed the programme, and 9 (60.0%) were retained at 6 months. Participants found the intervention credible and acceptable. At 6 months, LBP disability, pain intensity, back-pain beliefs, the ability to reinterpret pain sensations, fear-avoidance beliers about work and depression scores indicated better outcomes. However 6 month scores also indicated higher catastrophising, fear-avoidance beliefs about physical activity and anxiety levels.

Conclusions: The experiences of Bahraini patients with LBP were similar to findings reported in the Western literature; however some factors differed due to the influence of Muslim Arab culture. The results encourage the use of a culturally-modified biopsychosocial approach to pain management in Bahrain, and other cultures. Therefore, culturally-specific factors such as differences in the LBP experiences between genders, culturally-specific examples and activities, religious coping strategies, and use of catastrophic expressions were taken into consideration when designing the PMP. Participants found the intervention credible and acceptable, but as in Western PMPs, there were high attrition rates. Changes such as the incorporation of value-based goals and the use of booster phone calls are suggested to improve adherence and facilitate behaviour change. The results of this thesis warrant further investigation into the effectiveness the physiotherapist-led PMP in Bahrain for LBP.

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Abbreviations

ADL	Activities of daily living
ADP	Ability to Decrease Pain subscale
ArADP	Ability to Decrease Pain subscale
ArBBQ	Arabic Back Beliefs Questionnaire
ArCAT	Arabic Catastrophizing subscale
ArCOP	Arabic Control Over Pain subscale
ArCSQ	Arabic Coping Strategies Questionnaire
ArCSS	Arabic Coping Self-statements subscale
ArDA	Arabic Diverting Attention subscale
ArIBA	Arabic Increasing Behavioural Activity subscale
ArIPS	Arabic Ignoring Pain Sensations subscale
ArPH	Arabic Praying and Hoping subscale
ArRMDQ	Arabic Roland-Morris Disability Questionnaire
ArRPS	Arabic Reinterpreting Pain Sensations subscale
BBQ	Back Beliefs Questionnaire
BPC	Benan Physiotherapy Clinic
CAT	Catastrophizing subscale
CBT	Cognitive-behavioural therapy
COP	Control Over Pain subscale
CSQ	The Coping Strategies Questionnaire
CSS	Coping Self-statements subscale
DA	Diverting Attention subscale
FABQ	Fear-avoidance Beliefs Questionnaire
FABQ-pa	Fear-avoidance Beliefs Questionnaire – physical activity subscale
FABQ-w	Fear-avoidance Beliefs Questionnaire – work subscale
FABs	Fear-avoidance Beliefs
HADS	Hospital Anxiety and Depression Scale
HADS-anx	Hospital Anxiety and Depression Scale – anxiety subscale
HADS-dep	Hospital Anxiety and Depression Scale – depression subscale
IBA	Increasing Behavioural Activity subscale
IPS	Ignoring Pain Sensations subscale
ITHC	Isa Town Healthcare Centre
LBP	Low back pain
LTFU	Lost to follow-up
MRC	Medical Research Council
NC	Non-completers
NICE	National Institute for Health and Care Excellence
NIHR	National Institute of Healthcare Research
PCS	Pain Catastrophizing Scale
PH	Praying and Hoping subscale
PMP	Pain management programme
RMDQ	Roland-Morris Disability Questionnaire
ROM	Range of movement
RPS	Reinterpreting Pain Sensations subscale
RTW	Return to work
SLR	Straight leg raise
SMC	Salmaniya Medical Complex
TPC	Taaheal Physiotherapy Complex
TSK	Tampa Scale of Kinesiophobia
VAS	Visual Analogue Scale

Chapter I: Introduction

1.1 Low back pain and disability

1.1.1 Low back pain and the Arabian Gulf Region

Low back pain (LBP) is the most common cause of pain presented to general practitioners (GPs) and a leading cause of disability and healthcare costs worldwide (Bener et al., 2015; Bener et al., 2013). Recent analyses of the burden of diseases, injuries and risk factors in the Arab world show that the burden of musculoskeletal diseases such as LBP has been on the rise from 1990 and 2010 and closely resembles that of Western countries (Mokdad et al., 2014). The point prevalence of LBP in primary care centre attendees in Arab high income countries[1] (Mokdad et al., 2014), was reported at 64.7% in the United Arab Emirates (UAE) (Bener et al., 2006), 51.6% in the Kingdom of Saudi Arabia (Al-Shammari et al., 1994) and 59.2% in Qatar (Bener et al., 2013). Data from Qatar and the UAE show that approximately 54% of patients with LBP were females (Bener et al., 2006; Bener et al., 2013).

The Kingdom of Bahrain is an Arabic country in the Middle East. It is considered part of the Arabic Gulf States (knows as the Gulf Region)[2] and economically part of the Gulf Cooperating Council[3]. The Arabian Gulf States share economic relations, similar infrastructure, regional culture and spoken dialects (El-Islam, 2008; Margolis et al., 2003). No data is currently available from Bahrain with regards to the prevalence of LBP. It is assumed to be within the range of reported values from other studies in the Gulf Region. These values are also within the reported range (50%–80%) of those in modern industrial societies (Ehrlich, 2003; Manchikanti, 2000; Maniadakis and Gray, 2000). Reports from the Gulf Region, including Bahrain, estimated that 45% of LBP symptoms are due to non-specific LBP (El Sissi et al., 2010).

[1] Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates were categorised as high income countries by Mokdad, A.H., Jaber, S., Aziz, M.I.A., AlBuhairan, F., AlGhaithi, A., AlHamad, N.M., Al-Hooti, S.N., Al-Jasari, A., AlMazroa, M.A., and AlQasmi, A.M. (2014). The state of health in the Arab world, 1990–2010: an analysis of the burden of diseases, injuries, and risk factors. The Lancet 383, 309-320.

[2] The Arabic Gulf States, Arabian Gulf States or Persian Gulf States are all acceptable terms to describe six independent nations: Bahrain, Kuwait, Saudi Arabia, Qatar, Oman and the seven principalities of the United Arab Emirates.

[3] The Gulf Cooperating Council (GCC) started with the Arabian Gulf States however is expanding to include the last existing monarchies in the Middle East (Jordan and Morocco). Consequently it is a term to describe political and economic relations and not cultural grouping.

1.1.2 Characteristics of low back pain

This section aims to clarify what is referred to as *non-specific chronic low back pain*; abbreviated as LBP. Duration of symptoms, location of pain, involved structures and the exclusion of pathology will be taken into consideration.

From a bio-medical point of view, patients are labelled as *chronic* when pain persists beyond the early and acute phases of the tissue healing process (O'Sullivan, 2005). Therefore, LBP is commonly categorized as *chronic* when symptoms persist past three months. Although typically LBP has been categorized as acute ≤6 weeks, subacute at 6 weeks to 3 months and chronic after ≥3 months; the literature recognizes that recurrences and fluctuations in pain and disability levels are part of the natural history of LBP (Croft et al., 1998; Ostelo et al., 2008).

The *lower back* area refers to the location of pain below the ribcage to the gluteal creases, and includes pain of somatic or radicular nature, and gradual or traumatic incidences (Abenhaim et al., 2000; NICE, 2009). Patient requests for referrals for medical investigations or other types of treatments have shown an association with negative LBP outcomes and disability (Bath and Grona, 2015; Kovacs et al., 2011; Truchon and Fillion, 2000; Waxman et al., 1998), however clinical or diagnostic findings have had limited clinical value and have served to rule out sinister pathology rather than the identification of involved structures (Luoma et al., 2000; Van Tulder et al., 1997). For example, changes on magnetic resonance imaging have been found in symptomatic (Luoma et al., 2000; Paajanen et al., 1989; Tervonen et al., 1990) and asymptomatic people (Boden et al., 1990; Jensen et al., 1994a; Powell et al., 1986). Furthermore, systematic reviews (Kent and Keating, 2008; Van Der Hulst et al., 2005) have found that the severity of diagnoses and clinical assessments of muscle strength, height and weight, lumbar range of movement and palpation had limited or no ability to predict LBP prognosis. Consequently, *non-specific* refers to LBP that is not secondary to a known pathology (such as infections, tumours, fractures, or inflammatory disorders) (Balagué et al., 2012; Koes et al., 2006; van Middelkoop et al., 2011). Subsequently, conventional physiotherapy management approaches have been similar for chronic non-specific LBP regardless of clinical or diagnostic findings. Management strategies are discussed in section 1.2.

For the purpose of this thesis, and based on the overview above, *non-specific chronic low back pain* (abbreviated as LBP) is defined as: back pain between the ribcage and gluteal creases; with or without leg pain; of gradual or traumatic incidences; not secondary to a known pathology (such as infections, tumours, fractures, or inflammatory disorders), and has lasted for longer than three months.

1.1.3 The biopsychosocial model

Regardless of the varied biomedical features that LBP patients could present with, they seem to share certain psychosocial factors that contribute to their LBP pain and disability. Therefore the definition has gone beyond the duration of symptoms, physical and clinical examinations, to include the impact of the patients' function and psychological sate (Waddell, 1987).

A multidimensional approach to LBP management based on the biopsychosocial model is wildly accepted. The model encompasses biomedical, psychological and social (including environmental) factors that contribute to LBP disability. It acknowledges both the individual and overlapping nature of the three dimensions and stresses the role of psychosocial factors contribution to LBP disability; activity limitations and participation restrictions due to back symptoms (Waddell, 1987; Waddell, 2006; World Health Organization, 2012).

Pain is recognised as in individual physical and emotional experience. Therefore it is expected that it would be influenced by culture, because culture influences' individuals' psychological, social, physical and spiritual dimensions (Davidhizar and Giger, 2004; Narayan, 2010). Although the biopsychosocial model encourages the exploration of these dimensions with LBP patients, it is unclear how outcomes might differ between cultures. It is assumed that culture will influence the way an individual perceives and communicates pain (Davidhizar and Giger, 2004; Narayan, 2010). It will affect the way patients view treatment options, healthcare professionals and the healthcare system (Kvarén and Johansson, 2004). Limited participation in society or at work following LBP is likely to be influenced by the expected role of individuals in their society, and organisational structures and regulations in their country (Sanders et al., 1992). Therefore individuals are likely to develop coping strategies and behaviours that reflect their beliefs system, psychological well-being and social circumstances (Kvarén and Johansson, 2004). Therefore, the biopsychosocial factors that contribute to the LBP experience and disability and constitute the foundations of this management approach might differ. Consequently, the LBP experience and needs of patients' in different cultures is expected to vary and needs to be taken into consideration.

1.2 Low back pain management

1.2.1 Physiotherapy

Guidelines in the UK (NICE, 2009) advise general practitioners to educate patients about LBP and the importance of exercises, with the consideration of a referral to physiotherapy (or other healthcare practitioners) for manual therapy, exercise programmes or acupuncture. Patients are no longer offered electrotherapy modalities for this condition. Studies have shown

that patients receiving education in addition to usual care had better outcomes than usual care on its own (Engers et al., 2008). Additionally, education on its own, manual therapy and acupuncture were not more effective than each other and other conservative management strategies (Engers et al., 2008; Furlan et al., 2005; Rubinstein et al., 2011). Strong evidence has been found to suggest that exercise is at least as effective as other modalities (Hayden et al., 2005a). The evidence for exercise being more effective than other conservative treatment has been conflicting. However further analyses showed that evidence from 29 trials suggests that LBP pain and functional outcomes are significantly better following exercise, albeit small effect sizes (Hayden et al., 2005b). Effective treatment has been described as individually designed exercise programmes (mainly consisting of muscle strengthening and stretching) with supervision (follow-up, group or supervised exercise) in healthcare settings, done at high dosage and in addition to other conservative treatment (which include behavioural and/or manual therapy, advice and education) (Hayden et al., 2005b). A later review (Searle et al., 2015) found strength or resistance, and coordination or stabilisation exercises to be more beneficial than comparators for reducing symptoms and pain associated with LBP. The review was unable to include results for disability, function or other well-being measures due to the heterogeneity of the outcome measures. Another recent systematic review (O'Keeffe et al., 2015) found no difference in short, medium and long-term outcomes in pain and disability following physiotherapy exercise-based individual and group programmes for musculoskeletal pain. Although the findings encourage the use of group programmes for cost-effectiveness, the results should be approached with caution as they are based on 14 studies, only 7 of which treated back pain.

1.2.1 Physiotherapy for low back pain in Bahrain

Western medicine is widely available in the Bahrain, though a socialized government system (MoH, 2010). Physiotherapy is a recognised health care profession in Bahrain and physiotherapists are recognised as autonomous healthcare professionals by the Ministry of Health, Bahrain. A four-year physiotherapy undergraduate training programme has been available in Bahrain since 2003. However, most physiotherapists have trained abroad in the GCC (Kuwait and Saudi Arabia) and the UK.

Physiotherapy services are available both in the private sector through self-referral (paid privately or backed by private health insurance plans), or free through a public healthcare system. Patients can access public physiotherapy services following referrals from public primary care centres' general practitioners (GPs). No data is available on how many sessions of physiotherapy patients typically receive in private or public care. Physiotherapists report that in private healthcare it is based on a patient's available funds, or allowance from the insurer.

Physiotherapists working in public services report that the number of sessions they provide to patients is up to their discretion.

Little is known about physiotherapy for LBP management in Bahrain. Physiotherapists report the use of a mixture of hands on modalities, such as massage, manual therapy, electrotherapy and exercise to treatment LBP symptoms. Some healthcare centres offer back exercise classes or hydrotherapy for LBP patients. Although some physiotherapists have acknowledged the contribution of patients' psychosocial issues towards their LBP symptoms, little time and attention is focused on managing such issues. Physiotherapists explained that this is due to time constraints, their belief that psychosocial management might be outside their scope of practice, and/or worries about patients' reactions to this approach.

Although most Arabs in the Gulf Region are accommodated to Western healthcare systems, traditional medicine is still available (Margolis et al., 2003). Traditional medicine is usually delivered by a traditional masseur or a masseuse. In addition to providing patients with massage services using traditional oils and herbs, they provide *Hijama*[4] (wet cupping) and *Al-kay*[5] (cautery) to help relieve physical pain. Physiotherapists in Bahrain report that some patients are likely to use these methods and comment on their successes or failure in manging their LBP symptoms during physiotherapy consultations.

1.2.2 Pain management programmes

Due to the contributing role of psychological and social factors to LBP disability (section 1.1.3), guidelines (NICE, 2009) recommend the referral of patients for combined physical and behavioural treatment programmes if they have tried the aforementioned courses of treatment and exhibit high disability and/or psychological distress. Behavioural interventions aim to challenge and modify maladaptive thoughts, feelings and behaviours as well as educate patients about dysfunctional sensory phenomena in attempt to reduce the impact of the pain experience.

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[4] *Hijama* means cupping, but in Arab and Muslim culture it refers specifically to wet cupping. It is an ancient method to treat diseases. The technique involves the use of a hollow vessel attached to the skin surface of the problematic area by suction and followed by blood extraction. The extracted blood is believed to be harmful and its removal rids the body from potential harm. Hanan, S., and Eman, S. (2013). Cupping therapy (Al-Hijama): It's impact on persistent non-specific lower back pain and client disability. Life Sci J 10, 631-642.

[5] *Al-kay* means cautery. It is the placement of a hot metal or iron rod over the region of pain or disease after being heated over hot charcoal. Hajar Albinali, H. (2003). Arab Gulf traditional medicine: cautery. Heart views 5, 178-183.

Pain management programmes (PMPs) for LBP informed by principles of cognitive-behavioural therapy (CBT), have been a common method for the reduction of LBP disability by facilitating behaviour change. PMPs underpinned by CBT principles aim to identify and modify harmful thoughts (cognitions) to change behaviour and stimulate the development and utilization of active coping strategies for dealing with pain. This improves adjustment to chronic pain, including the perception that pain is controllable. In return, the ability to implement a number of coping strategies is assumed to be beneficial in shaping beliefs about pain as a manageable stressor (Henschke et al., 2010; Hoffman et al., 2007; Pincus et al., 2006). A Cochrane review (Henschke et al., 2010) found moderate to low quality evidence for no differences in pain, disability and depression following behavioural versus other types of treatment for LBP. Although there was moderate quality evidence for a significant decrease in pain in the short-term when compared to usual care, the improvement was not significant in the medium-term and was from two randomized controlled trials (RCTs) only. The review included 30 trials, only 9 of which compared a behavioural intervention to other treatments. Biopsychosocial factors apart from those mentioned above were not included in the review due to the heterogeneity of the studies. Therefore, the review calls for further high quality research to investigate the effectiveness of behavioural interventions on factors associated with LBP disability and analyses of cost-effectiveness.

A physiotherapist-led PMP conducted at the Physiotherapy Department at Guy's and St Thomas' NHS Trust was as effective as usual care and spinal stabilization exercises for the reduction of LBP disability (Critchley et al., 2007). The study included patients with LBP of more than 12 weeks, with or without leg symptoms and over the age of 18; and excluded patients with previous spinal surgery, physiotherapy for LBP in the last 6 months, medical conditions such as rheumatological diseases or other disabilities that could affect participation in group exercise for LBP. The content of the programme was based on principles outlined the Back to Fitness Programme (Klaber Moffett and Frost, 2000) which has shown small but statistically significant beneficial effects compared to usual GP care (Klaber Moffett et al., 1999). The programme undertook a biopsychosocial approach, underpinned by principles of CBT, to address concepts of chronic pain management. This included targeting fear and avoidance of movement; the use of positive coping strategies; stretching and light aerobic exercise progressed according to pacing principles; and the encouragement of a graded return to activities with goal setting. The PMP was delivered by a senior physiotherapist and a physiotherapy assistant. In addition to the PMP's effectiveness in the reduction of LBP disability, it was associated with less healthcare usage and consequently offers a cost-effective alternative to usual physiotherapy care (Critchley et al., 2007).

To the author's knowledge, there are no options for LBP management that include elements of LBP education and/or facilitation of behaviour change for LBP in Bahrain. Additionally, there are no studies reporting on the development or implementation of a physiotherapist-led PMP for LBP in the Gulf Region. Therefore, available findings from cross-sectional studies, multidisciplinary and physiotherapist-led PMPs in Western and non-Western cultures are discussed throughout sections 1.3 and 1.4 alongside the factor being reviewed to inform the development of the intended intervention.

1.3 Socio-demographic factors associated with LBP disability

The relationship between social and demographic factors to LBP and LBP disability varies between different studies (Kent and Keating, 2008). Factors that could possibly vary for cultural reasons have been discussed as part of this review. These factors also set the scene for relationships that might be important for explaining LBP disability in Bahrain.

1.3.1 Age

Some Western studies have found no relationship between age and LBP disability in their samples (Briggs et al., 2010; Gesztelyi and Bereczki, 2006; Symonds et al., 1996). Another two studies compared function in LBP patients across different countries and did not find age to predict LBP disability either (Genêt et al., 2009; Sanders et al., 1992). Two studies measuring LBP disability in elderly patients found conflicting results; one study found that older age was directly associated with depression and LBP disability in Spain (Kovacs et al., 2011), but younger age was associated with depression and hence LBP disability in the United States (Boakye et al., 2013). Variations in the associations between age and LBP outcomes are expected due to the differences in health beliefs and expectations of certain age groups in different countries. Inconsistent findings could also be explained by considering other characteristics of the study sample. For example a review aiming to identify risk factors in injured workers found older age was a predictor of recurrent or chronic disability (Turner et al., 2000a), compared to no association from the results of a review that included studies recruiting patients and injured employees (Van Der Hulst et al., 2005). Findings from the Gulf Region showed that the prevalence of LBP was associated with younger age and lower education in the UAE (Bener et al., 2003; Bener et al., 2004). In Kuwait, younger workers exhibited higher fear-avoidance beliefs (FABs) than older workers (Al-Obaidi et al., 2005). This is supported by findings from another non-Western study; who also found an inverse relationship between age and FABs (Cai et al., 2007). These findings show that the relationship between LBP disability and age could differ in different cultures, and understanding the

relationship between age and LBP disability in Bahrain would be important for LBP management.

1.3.2 Gender

Western studies have not found gender to play a role in LBP disability (Briggs et al., 2010; Symonds et al., 1996; Turner et al., 2000a; Van Der Hulst et al., 2005). One study reported LBP disability was higher in British females (Sloan et al., 2008). A study comparing LBP outcomes in France, Ivory Coast, Morocco and Tunisia did not find gender to predictive of LBP disability in any culture (Genêt et al., 2009), however one non-Western study found that LBP disability was lower in Singaporean females (Cai et al., 2007). The differences in the relationship between gender and LBP disability could be attributed to social factors or expectations from certain genders in certain cultures (Davidhizar and Giger, 2004; Narayan, 2010). Therefore, it is important to understand gender roles and family structures in Arab families before exploring findings from the Gulf Region.

Typical Arab families tend to follow a hierarchical structure. The father has the highest social, legal and financial authority in the household (Hattar-Pollara et al., 2000). He is followed by the mother, who is the primary care giver. Culture and traditions drove women to measure their own success, and the success of other females based on their ability to marry and have children (Hattar-Pollara et al., 2000; Sidani, 2005). Rates of women's workforce participation have grown rapidly due to globalisation (Sidani, 2005). Working women are still expected to continue with much of the traditionally mandated household and childcare duties in addition to their employment (Hattar-Pollara and Dawani, 2006; Hattar-Pollara et al., 2000, 2003; Mohsen, 1985).

Studies from the UAE (Bener et al., 2003; Bener et al., 2004; Bener et al., 2006) and Qatar (Bener et al., 2010; Bener et al., 2013) show that the prevalence of LBP was higher in women than men, particularly housewives. LBP interfered with female's lifestyle and ADLs such as house chores, and preparation of food for guests (Bener et al., 2003; Bener et al., 2004). It is mentioned that females measure their success based on their ability to manage their family life, therefore their efforts to maintain a successful household could be why more women than men report LBP interferes with their lifestyle and chores (Hattar-Pollara et al., 2003). Women were also less likely to engage in exercise and were more likely to be obese, and those two factors were seen to be associated with LBP prevalence (Bener et al., 2003; Bener et al., 2004). Depression, distress and anxiety were common amongst patients with LBP compared to other patients accessing primary care, and housewives were also more likely to report symptoms of depression lasting over a longer period of time (Bener et al., 2013). Hectic

lifestyles that combine work and family responsibilities could explain reports from women not having enough time to exercise to manage obesity and LBP (Benjamin and Donnelly, 2013).This has been seen to increase mental health problems and stress-related illnesses in Arab women (Hattar-Pollara et al., 2000)

Previous systematic reviews have not found gender or marital status to be predictive of LBP prognosis (Turner et al., 2000a; Van Der Hulst et al., 2005), so this supports the idea that associations with gender could be culture-specific. It is important to note that Bener et al., (2003, 2004, 2006, 2010, 2013) based their findings on samples of individuals seeking care at primary healthcare centres, which biases their sample and reduces it generalisability to the general population. On the other hand, it could be inferred from their data that patients reporting symptoms of distress (Waxman et al., 1998), and interference with ADLs (Ferreira et al., 2010) are more likely to seek care for complaints of LBP symptoms, which is not a gender or culturally-specific finding.

1.3.3 Work-related factors

Reducing LBP and its disability aims to improve return to work (RTW). Work-related factors have been found to affect RTW and subsequently are a great cause of economic loss (Linton, 2001; Turner et al., 2000a). Reviews of mainly Western studies have found older age (Turner et al., 2000a), job satisfaction (Hoogendoorn et al., 2000; Truchon and Fillion, 2000), work-related function (Van Der Hulst et al., 2005) and perceived ability to work (Truchon and Fillion, 2000) to be associated with LBP disability or RTW. Other factors such as length of time off-work (Crook et al., 2002; Diaz-Ledezma et al., 2009), recurrence of pain or persistent pain (Crook et al., 2002; Diaz-Ledezma et al., 2009), and FABs (Turner et al., 2006) have been seen to affect return to work and LBP disability in both Western and non-Western settings.

A systematic review (Hartvigsen et al., 2004), that rated its findings using levels of evidence that take study quality into consideration, found no evidence for a relationship-between the consequences of LBP and work-related outcomes. Evidence for no association with perception of work and social support at work was found to be of moderate level. The reviewers attribute this lack of evidence to unstandardized methods of data collection between the 40 reviewed studies, and differences in the interpretation of the psychosocial work-related outcomes measured (perceptions of work, organisational aspects, social support and stress at work) between workers of different ethnicities and cultures. Compensation factors might differ across different countries and consequently associate differently to LBP and LBP disability in different settings (Genêt et al., 2009; Sanders et al., 1992). For example, Genêt et al., (2009) studied 278 participants from France and four non-Western countries to find that despite

similar pain levels, disability and behaviour was different due to social circumstances such as worker's compensation. For example, France had the highest reports of work-related incidents, perhaps because financial compensation was offered during sick-leave. Another Spanish study by Kovacs et al., (2011) found that eligibility for workers compensation did not associate with LBP disability.

There is limited evidence to the relationship between work-related factors and LBP in Arab patients. Housewives were the largest occupational group for females, followed by administrative work for males to report LBP in primary healthcare (Bener et al., 2010). Individuals with higher income were also likely to suffer from LBP (Bener et al., 2013). This could perhaps be to their ability to afford to have time-off for LBP and to seek treatment. Additionally, this partly relates to why few studies have investigated work-related outcomes in LBP patients in the Middle East is the limited resources or absence of benefit systems for workers with musculoskeletal pain. Hence workers are less likely to ask for time-off or explore options for compensation that would contribute to the healthcare economic burden. Al-Obaidi et al., (2005) studied a sample of workers not receiving worker's compensation in Kuwait. They found that the fear-avoidance beliefs about work were not predictive of outcome, however fear-avoidance beliefs about physical activity were.

1.4 Psychosocial factors associated with LBP disability

Many reviews, mainly consisting of Western studies, report on the associations between LBP disability and pain-related beliefs (Kent and Keating, 2008; Linton, 2000; Truchon and Fillion, 2000; Van Der Hulst et al., 2005); fear-avoidance beliefs (Crook et al., 2002; Kent and Keating, 2008; Linton, 2000; Pincus et al., 2002); coping strategies (Kent and Keating, 2008; Linton, 2000; Pincus et al., 2002; Truchon and Fillion, 2000; Van Der Hulst et al., 2005); and symptoms of depression, anxiety and distress (Crook et al., 2002; Kent and Keating, 2008; Linton, 2000; Pincus et al., 2002; Truchon and Fillion, 2000; Van Der Hulst et al., 2005). The utility these findings have informed the development of pain management programmes (Pincus et al., 2002) and will therefore be the focus of this review.

1.4.1 Pain-related beliefs

The association of pain-related beliefs and LBP outcomes

It has been proposed that an individual's belief towards a certain healthcare issue will dictate his or her behaviour towards it (Hochbaum, 1958; Rosenstock, 1960, 1974). Most investigations have been carried out in Western settings. For example, negative beliefs about

pain have been seen to correlate with an increased likeliness to seek treatment for LBP (Buchbinder et al., 2001b; Ferreira et al., 2010; Mannion et al., 2013; Waxman et al., 1998). A meta-analyses by Ferreira et al., (2010) found that LBP patients with perceived bad overall health were more likely to seek treatment. These patients are likely to believe they are more susceptible to bad health and fear the severity of co-morbidities. The review also found that LBP patients with externalised beliefs regarding pain management, fear of work-loss or participation in sport were more likely to seek care. Findings from Ferreira et al., (2010) support the view that patients with high levels of disability (e.g. LBP was interfering with their participation in society), were more likely than patients with lower levels of disability to seek care for LBP. Although beliefs show a relationship with health-seeking behaviour, evidence for a relationship with other biomedical factors is not to be dismissed; such as pain intensity and duration of symptoms (Briggs et al., 2010; Ferreira et al., 2010; Heyduck et al., 2014; Sloan et al., 2008; Waxman et al., 1998).

Pain is associated with organic beliefs such as "pain = harm" and "others are best placed to manage pain" (Baird and Haslam, 2013; Sloan et al., 2008). Baird & Haslam (2013) assessed LBP patients, and individuals with and without musculoskeletal pain in the general public. LBP patients were found to have the highest organic scores, supporting findings that state that patients with the most organic, or *bio-medical* view are patients seeking healthcare. Multiple visits to various healthcare professionals have been found to eventually affect patients' beliefs with regards to the cause of the pain, their opinion of the healthcare professional and treatment choice (Buchbinder et al., 2001b; Chew-Graham and May, 1999; Little et al., 1998) and perhaps become more likely to desire a clear diagnosis (Heyduck et al., 2014; Walker et al., 1999). Furthermore, Baird & Haslam (2013) found that the presence of pain made no difference in the scores of the psychological component (of the Pain Beliefs Questionnaire) for individuals with or without pain in the general public. This finding further supports that the psychological factors influence care-seeking behaviours and LBP disability rather than just the presence of pain. The relationship of negative beliefs to depression, anxiety and distress (Asghari et al., 2008; Asghari and Nicholas, 2009; Heyduck et al., 2014) and disability (Buchbinder et al., 2001b; Heyduck et al., 2014; Symonds et al., 1996; Walsh and Radcliffe, 2002) is supported by findings in other studies.

Modifying beliefs to improve LBP outcomes

As beliefs about back pain are seen to influence disability and behaviour from the findings above, many strategies aimed at reducing LBP disability aims to modify patients' beliefs and have achieved positive outcomes (Glattacker et al., 2013; Mannion et al., 2013; Moseley, 2004; Moseley et al., 2004; Ryan et al., 2010; Symonds et al., 1996). Glattacker et al., (2013) found

that improvement in illness beliefs and beliefs about rehabilitation accounted for 14% of the improvement in function at three and six months following a multidisciplinary rehabilitation programme. Although the results of Galattacker et al., (2013) show a positive improvement in the short and medium-term, this study and the previously mentioned ones lack long-term follow-up and therefore the maintenance of these improvements remain unknown. On a positive note, strategies aimed at modifying pain-related beliefs have also been successful in reducing catastrophizing (Moseley, 2004; Moseley et al., 2004) and coping (Glattacker et al., 2013). This is probably due to the reassurance patients get once they acquire a better understanding of LBP (Bath and Grona, 2015; Dima et al., 2013).

Wide-spread programs aimed at educating the lay public have been carried out. Although success from campaigns in Australia have been found (Buchbinder and Jolley, 2005; Buchbinder et al., 2001b), limited success has been found in other countries. Results from Norway, Scotland and Canada appeared to have changed beliefs, but had no impact on other variables such as healthcare utilisation, disability behaviours and time-off work (Gross et al., 2012). One potential reason could be the difficulty in altering a common disabling belief held by the lay public that low back pain has a structural, mechanical cause (Zusman, 2013). Healthcare systems; including access to and cost of health, and different workers' compensation schemes could have been the reason why campaigns were not as successful outside of Australia.

Arab and Muslim health beliefs

Health beliefs are likely to vary between cultures, and beliefs about and attitudes towards LBP in the Gulf Region and Middle East are not very well known. Therefore acknowledging common Arab and Muslim health beliefs are important. Much of the literature describing this topic is anecdotal and written for Western healthcare professionals who might be dealing with Arab and/or Muslim patients. It is important to realise that Arabs and Muslims are distinct populations. However they tend to overlap. The teachings of Islam include a "way of life" therefore they will affect how an individual interacts with a healthcare provider or an illness. For example, many Muslims will accept an illness as God's will (El-Islam and Abu-Dagga, 1992). Furthermore, the illness is seen as God's method of testing you and your patience in life for a greater reward in the afterlife (Hammoud et al., 2005). This belief is linked to Muslims' belief in destiny, *Kader*. Kader may lead to negative outcomes in some cases where Muslims believe that this destiny has been determined for them by God and so they shall follow God's intended plan. Therefore, believers could be encouraged to accept God's will, accept Kader, and seek methods to improve one's health (Aflakseir and Coleman, 2011). According to Islam it is a sin to give up on treatment, give up on life or contemplate suicide. Therefore hopelessness is not

a common symptom in the chronically ill (Davidhizar and Giger, 2004; El-Islam, 2008; Leininger, 1999; Narayan, 2010). The acceptance of Kader and importance of improving one's health should be dealt with cautiously in Muslim populations. Such beliefs could be associated with negative outcomes, for example patients may keep asking for diagnostic tests and medical management in the context of LBP making it difficult for them to accept the nature of chronic pain and self-manage. The relationship between religious beliefs and coping is further explored later in section 1.4.3.

1.4.2 Fear-avoidance beliefs

Models explaining fear-avoidance beliefs

Fear-avoidance beliefs (FABs) models have attempted to explain how pain-related beliefs predict the transition from acute to chronic pain. Models such as the Fear-avoidance Model of Exaggerated Pain Perception (Lethem et al., 1983) and the Cognitive Model of Fear of Movement/(re)injury (Vlaeyen et al., 1995b) both revolve around the concept of fear of pain and patients' beliefs that movement(s) will reproduce their pain. The models suggest that patients will either 'confront' or 'avoid' the pain; choosing one of two opposing behavioural responses (Leeuw et al., 2007a; Vlaeyen and Linton, 2000). Confrontation, described as continuing with daily activities despite the pain, is seen as a positive response. It demonstrates that an individual adapts to the idea of the pain. Additionally, this response may lead to the reduction of pain-related fear and promote recovery. On the other hand, avoidance, where an individual postpones or averts an event, may lead to the maintenance of fear. Hence, avoidance-behaviour, a learned type of behaviour, may possibly result in a prolonged phobic state and promote LBP disability. See Figure I-1.

There are no standard recommendations for the assessment of FABs in clinical practice, however they are commonly assessed by the Fear-avoidance Beliefs Questionnaire (FABQ) (Waddell et al., 1993) and Tampa Scale of Kinesiophobia (TSK) (Vlaeyen et al., 1995a). Differences in the results of different studies could be attributed to the use of the different subscales, as the complete FABQ includes a work-subscale (FABQ-W). The TSK was developed to measure fear of '(re)injury' from movement regardless of work-related tasks (Miller et al., 1991; Swinkels-Meewisse et al., 2003). However findings show that TSK and FABQ measures correlate highly with LBP patients (Swinkels-Meewisse et al., 2003).

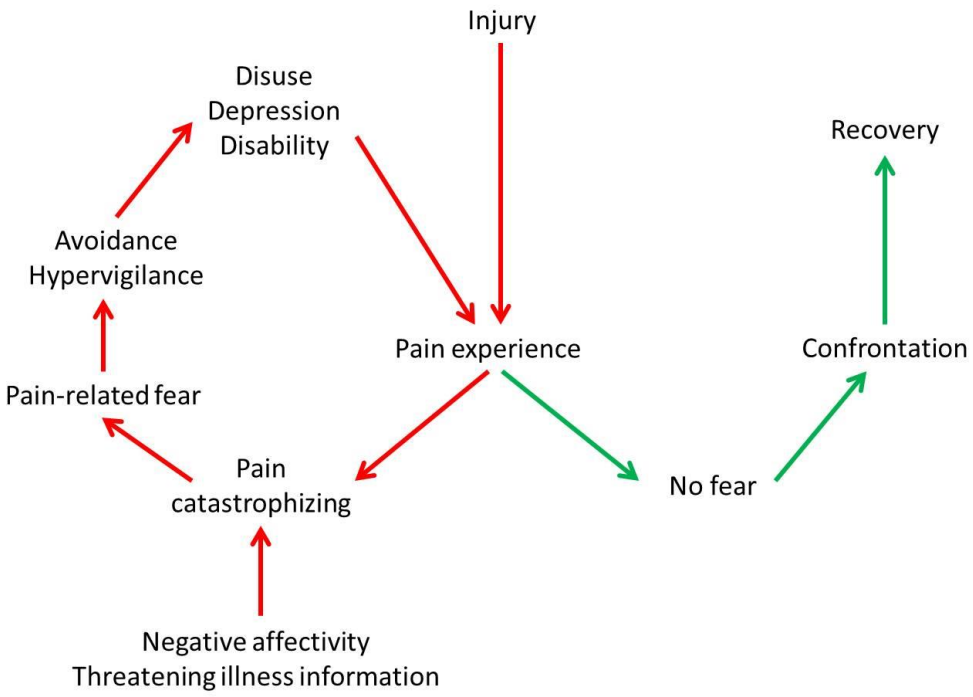

Figure I-1 The fear-avoidance model of chronic pain (Vlaeyen and Linton, 2000)

Relationship between fear-avoidance beliefs and LBP disability

Evidence from Western studies is examined first and compared to findings from non-Western studies. Cross-sectional studies have found positive relationships between FABs and LBP disability (Crombez et al., 1999; Vlaeyen and Crombez, 1999; Vlaeyen et al., 1995a; Vlaeyen and Linton, 2000). Waddell et al., (1993) assessed FABs using the FABQ in a group of chronic LBP patients and found that FABs about activities, including work, are strongly correlated to LBP disability. Results of the FABQ explained the largest variance in LBP disability, compared to biomedical variables and pain characteristics. Cai et al., (2007) also found FABs to be the greatest predictor of LBP disability in Singapore. Straight leg raise (SLR) and range of movement (ROM) measurements partially accounted for the relationship between FABs and LBP disability. SLR and ROM are measures of physical performance, therefore it can also be interpreted that FABs affect physical performance, hence disability.

Evidence from prospective studies shows a relationship between FABs and LBP disability at baseline and a positive change in FABs following physiotherapy and physiotherapy-led rehabilitation programmes. Mannion et al., (2001) measured factors associated with LBP disability, including FABs, on a cross-sectional basis at baseline and following therapy. FABs accounted for 3.7% of the change in disability. In this study, FABs had stronger correlations to and accounted for a larger variance of disability at baseline, than pain. Post-therapy, pain

accounted for a larger portion of variance for the change in disability. Findings from Hong Kong show similar results (Chan and Chiu, 2008). They found that FABs had a stronger correlation than pain at baseline pre-therapy and stronger correlations between pain and disability post-therapy. In both studies FABs had more significant results than other psychosocial factors. Chan and Chiu, (2008) has poor overall methodological quality. For example, they used the Physical Impairment Tool which is not validated for use with LBP patients. However both studies used the FABQ, and the results are comparable.

Woby et al., (2004) also found that FABs significantly decreased following physiotherapist-led pain management programme. Similarly to Chan and Chiu, (2008) and Mannion et al., (2001) who used non-behavioural physiotherapy interventions; FABs were the highest contributor to of all psychosocial factors to reduction in disability. These three studies only measured FABs at the end of the interventions, there was no long-term follow-up. Therefore, in those populations it cannot be assumed that this decrease is long-lived. A study by Moore et al., (2000) measured FABs at baseline, three, six and twelve month follow-ups. This study also compared a rehabilitation programme to usual care. This enabled the comparison of the reduction of FABs from more than one type of intervention. Unfortunately, the paper lacks a clear description of treatment(s) included in usual care arm. The group attending the programme showed significantly lower FABs scores compared with usual care at all follow up periods. This study did not statistically calculate the relationship between FABs and LBP disability. Therefore even though a reduction in FABs is found, its relationship with LBP disability cannot be compared with the correlations of previous studies. In this study by Moore et al., (2000) pain intensity was only significantly lower at six months. Pain reduction is not the main aim of a behavioural-based intervention. As discussed earlier, the aim of such programs is generally to modify beliefs and enable coping and adjustment to chronic pain, and possibly pain intensity in the long-term (The British Pain Society, 2008; McCracken et al., 1998). This could be why pain had greater reductions from physiotherapy interventions (Mannion et al., 2001, Chan and Chiu, 2008) but reduction in FABs were more significant following pain management programs (Woby et al., 2004, Moore et al., 2000).

Fear-avoidance beliefs and other cultures

Kovacs et al., (2007; 2005) found that FABs were not factors associated with LBP in Spanish adults and elderly. They attributed this to the difference between cultures, as most of the studies assessing FABs are Anglo-Saxon and northern European. A few studies have been conducted on Arabic LBP patients. Al-Obaidi et al., (2000) found that FABs were not related to disability, contradictory to later findings by Laufer et al., (2012) that FABs moderately correlated to LBP disability. Al-Obaidi et al., (2003) found FABs was related only to

performance by measuring walking velocity. In addition, a prospective study showed FABs decreased following physiotherapy however results were not compared against changes in LBP disability (Al-Obaidi et al., 2011).

Overall, the studies by Al-Obaidi et al., (2000, 2003, 2011) were of low methodological quality. The Arabic versions of the FABQ and RMDQ used were not translated nor validated according to accepted guidelines (Beaton et al., 2000). Therefore evidence for FABs in Arabic populations from Laufer et al., (2012) is more trusted. This study validated the FABQ in Arabic against a validated Oswestry Disability Index (ODI). For the purpose of this thesis, FABQ will be used to assess FABs in Bahraini LBP patients. Both the TSK and FABQ are frequently used and accepted measures of pain-related fear in LBP patients (Chapman et al., 2011; Geisser et al., 2000; Swinkels-Meewisse et al., 2003). The FABQ Arabic is the only available and validated tool to measure FABs with Arabic-speaking LBP patients (Laufer et al., 2012).

1.4.3 Coping strategies

Models of stress and coping have are used to examine adjustment to chronic pain. For example, Lazarus & Folkman (1984) have conceptualised stress as involving a relationship or transaction between environmental events and individual responses. Stress is a result of an individual appraising a situation as taxing or exceeding their resources and affecting their well-being. Chronic pain is conceptualised as a stressor to which individuals show widely diverse adaptations, ranging from little disruption in daily life to total disability. Variability in adjustment depends upon cognitive evaluations of the pain experience as well as behavioural and cognitive coping strategies employed to manage pain (Haythornthwaite et al., 1998; Jensen et al., 1991).

Coping is defined as purposeful efforts to manage and deal with the negative impact of stress (Jensen et al., 1991). Coping strategies in the context of chronic pain refer to the way individuals who experience pain develop ways to tolerate, minimize or reduce their pain (Rosenstiel and Keefe, 1983; Verra et al., 2006). Coping strategies can be cognitive and behavioural. Examples of cognitive coping strategies included praying, counting numbers and focusing on distracting features of the environment. Behavioural coping strategies involved activities such as walking or spending time with other individuals. Both categories include both active and passive coping strategies. Active strategies are defined as responses requiring a person to initiate some instrumental action to manage pain (such as exercising). Passive strategies involve withdrawal or giving up control to external force or agent (such as rest or dependency on medication) (Rosenstiel and Keefe, 1983; Verra et al., 2006). Other categories of pain coping strategies have been developed empirically through factor analysis. Several

studies have found that coping strategies are associated with LBP disability (Burton et al., 1995; Koleck et al., 2006; Spinhoven et al., 1989), persistent pain (Hasenbring et al., 1994; Philips and Grant, 1991), pain severity (Klenerman et al., 1995; Linton et al., 2000) and absence from work (Linton and Halldén, 1998).

The Pain Coping Strategies Questionnaire (CSQ) (Rosenstiel and Keefe, 1983) contains 42 items assessing seven pain coping strategies (diverting attention, reinterpreting pain sensations, use of coping self-statements, ignoring pain sensations, praying and hoping, catastrophizing and increasing behavioural activity), and two additional items to rate perceived control over pain. Although results of factorial analyses of the CSQ have been inconsistent across some studies and patient populations, the catastrophizing, and praying and hoping subscales have been retained in these analyses and has distinguished this outcome measure from others (Harland and Georgieff, 2003; Robinson et al., 1997; Swartzman et al., 1994; Tuttle et al., 1991; Woby et al., 2005). Most frequently, non-significant relationships were found between other subscales and measures of function, and have made it difficult to conclude on their relationship to LBP disability. This could be due to different approaches to factor analyses and consequently remaining items on resulting components, or different settings with different populations and their beliefs. Other outcome measures have been used to assess coping strategies. For example, The Pain-Related Self-Statement Scale assesses situation-specific cognitions that either promote or hinder attempts to cope with pain. Although the Pain-Related Self-Statement Scale has a catastrophising subscale and has demonstrated good reliability and validity (Flor et al., 1993), it does not attempt to distinguish different coping strategies. The Vanderbilt Pain Management Inventory (Brown and Nicassio, 1987) is another tool frequently used that distinguishes between passive and active coping strategies, and the (Jensen et al., 1995) has shown validity and reliability with measuring behavioural coping strategies. However, both tools do not measure catastrophizing. Recent reviews show that catastrophising has been the most investigated coping strategy with LBP pain patients and that the catastrophizing (CAT) subscale of the CSQ and Pain Catastrophizing Scale (PCS) were the most commonly used outcome measures to examine catastrophizing (Wertli et al., 2014a; Wertli et al., 2014b).

Catastrophizing

Catastrophizing is defined as: “an exaggerated negative mental set brought to bear during actual or anticipated painful experience” (Sullivan et al., 2001). Pain catastrophizing has consistently been associated with disability in LBP patients (Peters et al., 2005; Sullivan et al., 2005; Thomas et al., 2010) as well as in musculoskeletal pain (Severeijns et al., 2004). In addition to its association with disability, catastrophizing may be related to reports of

intensified pain (Buer and Linton, 2002; Peters et al., 2005; Severeijns et al., 2004; Sullivan et al., 2005). However, all these studies are correlational, allowing no causal inferences.

Findings from RCTs have found that catastrophizing has decreased following physiotherapy or PMP programmes. Two of them investigated changes in outcome following a multidisciplinary PMP and exercise programme (Wessels et al., 2007) and following physiotherapy, CBT and a PMP that combines both CBT and physiotherapy (Smeets et al., 2006). Both studies found that catastrophizing reduced in all treatment arms with no significant changes. However, both studies re-assessed outcomes post-intervention only, meaning that the long-term maintenance of this reduction for each treatment arm remains unknown. Mannion et al., (2001) found that reductions in catastrophizing amongst other psychological factors accounted for 4.1% of the variance in LBP disability three months post non-behavioural physiotherapy interventions. Another RCT (Spinhoven et al., 1989) found a short and long-term (12 months) decrease in catastrophising, and attributed a reduction in depression and pain behaviour following treatment to it. These improvements were following an inpatient followed by outpatient multidisciplinary PMP compared to waiting list controls. Findings from an intense PMP might not be generalizable to other healthcare settings. However, the results show a trend for effectiveness of PMP, physiotherapy or a combination of both in reducing catastrophizing at least in the short-term. Additionally, reductions in catastrophizing were also associated with reductions in pain (Leeuw et al., 2007b; Wessels et al., 2007), and internal pain control (Spinhoven et al., 1989) and symptoms of depression or distress (Edwards et al., 2005; Turner et al., 2000b). There is also some evidence that pain catastrophizing may be considered as a precursor to low back pain intensity (Picavet et al., 2002) and of pain-related fear (Leeuw et al., 2007b). Catastrophizing, within the context of pain, can be regarded as the cognitive element of the fear network alongside physiological reactivity and behavioural responses, because it refers to the process during which pain is interpreted as being extremely threatening, see Figure I-1 and section 1.4.2. Therefore, all these arguments support the consideration of catastrophising in LBP management.

Praying and hoping

The use of passive coping strategies such as praying and hoping (PH) has been suggestive of unfavourable LBP outcomes in Western literature (Burton et al., 1995; Jensen et al., 1994b; Koleck et al., 2006; Woby et al., 2005). For example, studies have found PH to be associated with a LBP disability in acute and sub-acute LBP patients at one year (Burton et al., 1995; Koleck et al., 2006). Other studies have found PH to have a weak relationship with disability (Turner et al., 2000b) and is a weak predictor of change in outcome following a 3-week inpatient multidisciplinary pain management program, however it was a predictor of other

unfavourable treatment outcomes such as depression and visits to physicians (Jensen et al., 1994b). There is limited research on PH as a coping strategy beyond cross-sectional surveys (Burton et al., 1995; Koleck et al., 2006; Turner et al., 2000b) and factorial analyses (Harland and Georgieff, 2003; Robinson et al., 1997; Swartzman et al., 1994; Tuttle et al., 1991; Woby et al., 2005) loading PH items of the CSQ onto different components to assess the questionnaire's structure. This could be due to the difficulty and appropriateness of addressing and modifying religious beliefs and coping mechanisms and consequently measuring changes in outcome, or due to the Western literature's regard to PH as an unhelpful coping strategy.

Several American studies have compared ethnic groups and found that Hispanic and African Americans are more likely to use PH as a distraction to cope when suffering from musculoskeletal pain (Edwards et al., 2005; Jordan et al., 1998), and that was found to predict greater musculoskeletal disability (Edwards et al., 2005). African Americans were also more likely to perceive it as a useful coping strategy. For example, Ang (2002) found that African American veterans were less likely to consider joint arthroplasty, and this was mediated by their perceived helpfulness of prayer.

Religious coping

Many individuals rely upon their religious beliefs and practices to help them cope. Religious coping comprises of various ways people use their religion and faith to manage stressful situations (Pargament, 2001). Pargament et al., (2000) argued that methods of religious coping do not duplicate those of nonreligious coping, and religious coping measures continue to predict significant portions of the variance in outcomes to life stressors after removing the effects of nonreligious coping measures. There is an emphasis within Islamic literature on religious beliefs and practices being used as resources for dealing with life difficulties. Islamic teachings encourage people to be patient, and to trust and turn to God in times of need for guidance. Islamic beliefs also give individuals meaningful interpretations of difficult events. Furthermore, Islamic teachings encourage believers to use certain religious beliefs and activities for coping with difficult situations. Some of these religious activities involve specific prayers, fasting, pilgrimage, and reciting versus of the Qur'an (Aflakseir and Coleman, 2011).

Therefore, religious coping involves the use of cognitive or behavioural strategies that are based on religious beliefs of practices to help manage emotional stress or physical discomfort (Clements and Koenig, 2014; Koenig and Clifford, 1995). Religious beliefs could associate with helpful or unhelpful coping strategies (see section 1.4.1 Arab and Muslim health beliefs). Helpful religious coping is expressed through attempts to maintain a loving and supportive spiritual connection with God, to work with God to solve problems, to seek forgiveness of sins,

and to use religious beliefs to reframe or to reduce the importance of personal difficulties. Examples include attending houses of worship, speaking to clergy, engaging in activity because religion promotes health. Unhelpful religious coping is apparent in beliefs that problems might reflect the punishment or impotence of God, the abandonment of the individual by God or by the clergy, and the work of the devil, or over-reliance on God without actively seeking a cure.

1.4.4 Depression, anxiety and distress

The scale of the problem

Depression, anxiety and distress have shown a significant relationship to negative LBP outcomes in several studies (Burton et al., 1995; Carroll et al., 2004; Croft et al., 1995; Glombiewski et al., 2010; Hasenbring et al., 1994; Klenerman et al., 1995; Leino and Magni, 1993). The prevalence of depression in individuals with chronic pain ranges from 25 to 50% (Bener et al., 2015; Kroenke et al., 2011). LBP was amongst certain types of chronic pain (along with neck and hip pain) that are more likely to be associated with depression (Linton, 2000; Rusu et al., 2012). Individuals who enjoy certain activities or hobbies, responsibilities or engage in physically demanding occupations that may exacerbate their pain often find that they are unable to continue. Lack of participation in personally valued activities, inability to fulfil expected social roles, or career changes are often as distressing as the pain itself (Snelgrove and Liossi, 2013). Patients also report emotional distress from the need to repeatedly engage within the healthcare system for further tests or investigations in search of a diagnosis and reassurance (Bath and Grona, 2015; Dima et al., 2013; Verbeek et al., 2004), however another study (Waxman 1998) has found that the presence of depressive symptoms was more likely to cause an individual to seek treatment for LBP. Emotional distress has also been reported from the social consequences of LBP, such as healthcare costs (Crook et al., 2002), time off-work (Crook et al., 2002) and seeking disability benefits (Gebauer et al., 2015).

Usually, an acute failure to achieve an important goal may lead to transient negative emotional impact that serves as the adaptive purpose of increasing motivation to pursue the goal (Waters et al., 2015). Regulatory focus theory (Higgins, 1997) suggests that when individuals feel sadness, disappointment and frustration when they are unable to “make good things happen” (promotion goal), and feel anxious, tense and apprehensive when they are unable to “keep bad things from happening” (prevention goals). Relevant examples for LBP patients would be to minimise walking distance in effort to prevent pain flare-ups (prevention goal), however in return they might not be able to engage in an activity that gives them pleasure and sense of achievement such as an outdoor family activity (promotion goal). Repeated failure in achieving promotion or prevention goals could result in a sense of powerlessness and

subsequent loss of motivation to pursue these goals (Karoly et al., 2008; Viane et al., 2004). Cognitive models of depression were consistent with the prediction that depression results from chronic failure to attain desired outcomes (Abramson et al., 1989; Karoly et al., 2008; Strauman, 2002; Viane et al., 2004).

The relationship of psychological factors and LBP outcomes

Depression, anxiety and distress have shown a significant association with the presence of negative LBP outcomes in several Western studies (Burton et al., 1995; Carroll et al., 2004; Croft et al., 1995; Hasenbring et al., 1994; Klenerman et al., 1995; Leino and Magni, 1993). A cross-sectional study also found depression to account for 6.3% and 8.0% of the variance in pain and disability after accounting for other psychosocial factors (Glombiewski et al., 2010).

Studies have shown that improvements in LBP outcomes have been shown to be associated with a decrease in psychological factors of which symptoms of depression, anxiety and distress are included (Bath and Grona, 2015; Linton, 2000; Pincus et al., 2002). Furthermore, findings also show improvement following CBT-informed pain management programs for LBP (Glombiewski et al., 2010; Skidmore et al., 2015). The improvement of these symptoms and hence LBP outcomes could also be due to associations between depression and negative beliefs (Asghari et al., 2008), pain intensity (Asghari et al., 2008; Mannion et al., 2001), and FABs (Pincus et al., 2002; Pincus et al., 2006; Vlaeyen and Linton, 2000) found from Western and one non-Western studies. These findings are supported by the results of a meta-analysis that found improvements in depression following interventions with CBT components, and show positive effects for pain interference in the short-term and return to work in the long-term (Hoffman et al., 2007). Results of these studies, in combination with the theoretical underpinnings outlined above, warrant assessing and addressing symptoms of depression, anxiety and distress as part of a holistic approach to improve LBP outcomes in practice.

Studies do not distinguish clearly between depression, anxiety and distress because tools used to measure these outcome measures tend to merge the three and report them together (Linton, 2000; Pincus et al., 2002). The Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1986) was developed to identify anxiety disorders and depression among patients in non-psychiatric hospital clinics. The questionnaire excludes items questioning the presence somatisation symptoms; bodily symptoms manifested by psychological distress, such as dizziness, headaches, insomnia, and fatigue to prevent noise from somatic disorders on the scores. The questionnaire also ‘‘carefully and distinguish between the concepts of anxiety and depression’’ (Snaith, 2003; Zigmond and Snaith, 1986). HADS has demonstrated a stable two-factor structure, internal consistency, specificity and sensitivity to the General Health

Questionnaire and concurrent validity against the Beck's Depression Inventory, Spielberger's State-Trait Anxiety Inventory, Clinical Anxiety Scale, and Symptom Checklist 90 Scale Anxiety and Depression subscales (Bjelland et al., 2002). Due to the aforementioned reasons and the availability of a validated and reliable HADS in Arabic (El-Rufaie and Absood, 1995; El-Rufaie and Absood, 1987), it will be used to assess for symptoms of anxiety and depression throughout this thesis.

Low back pain and depression in the Gulf Region

Little is known about symptoms of distress, depression and anxiety in Arab patients. Bener et al., (2006) assessed for the prevalence of depression and somatisation in LBP patients attending primary healthcare services in the UAE, and found slightly larger association between depression and LBP than with somatisation, however both were high in younger patients with lower educational levels. On the other hand, in Qatar the prevalence of somatisation was slightly higher in a similar patient population; with headaches, and pain in joints, arms and legs reported as the most common symptoms (Bener 2013). LBP patients in Qatar had higher prevalence of both somatisation and depression than primary care patients without LBP. The prevalence of somatisation in this patient population could be due to the negative image of mental health disorders in such cultures, where patients purposefully or subconsciously reinterpret psychiatric illness as bodily pain (Nasir and Abdul-Haq, 2008). The HAD aims to assess for anxiety and depression and eliminate "noise" from somatisation; therefore it is a useful tool to use in populations where both disorders are similarly prevalent. This can help clearly identify and justify treatment options.

1.5 Rationale

This overview of relevant literature has shown that certain psychosocial factors are associated with LBP and disability, and attempts to challenge modifiable factors have been successful in short and long-term studies. Although such approaches to LBP management could be delivered on one-to-one basis, group based physiotherapist-led PMP programmes have shown similar outcomes to individual treatment and lower costs (see 1.2.2). Although very little is known about LBP, its disability and associated factors in Bahrain and Arabs in general; the brief examination of Muslim and Arab belies makes it evident that culture can shape healthcare beliefs and behaviours. It is expected that these culturally-specific beliefs and behaviours will dictate patients' coping and therefore levels of disability. Therefore, before efficacy testing of a group-based, physiotherapist-led PMP in Bahrain, a few issues need to be considered.

Medical Research Council (MRC) guidelines for developing and evaluating complex interventions have been used to guide this intervention development study (Craig et al., 2008).

An intervention development study "describes the rationale, decision-making processes, methods and findings which occur between the idea or inception of an intervention until it is ready for formal feasibility, pilot or efficacy testing prior to a full trial or evaluation" (Hoddinott, 2015). For the case of this PhD thesis, an intervention will be developed for feasibility and acceptability testing with Bahraini LBP patients.

Guidelines suggest that the development of complex intervention studies are informed by a systematic review of the literature. Accordingly, a systematic review of factors associated with LBP disability in non-Western cultures will be conducted first to examine differences in associations between biopsychosocial factors and LBP disability. Following that, an investigation of factors associated with LBP disability in Bahrain, such as pain intensity, FABs, coping mechanisms, depression and anxiety, is necessary. This chapter has shown that there are a few valid and reliable tools available in Arabic to assess these dimensions in Bahraini patients. Therefore, translating and cross-culturally adapting tools following recommended guidelines (Beaton et al., 2000) is essential to identify culturally-specific factors. A cross-sectional quantitative survey to investigate the relationship between LBP disability and associated factors would be limited in identifying concepts beyond the theoretical underpinnings of the questionnaires used; therefore an in-depth qualitative exploration of the beliefs of Bahraini patients with LBP and their expectations of a physiotherapist-led PMP will be carried out to complement the survey. The identification of factors associated with LBP disability in Bahrain, comparison with Western findings and an appreciation of their role in underpinning PMPs facilitated the design of PMP suitable for the target population. A feasibility study will be conducted to assess patients' acceptability of the PMP, the feasibility of conducting the programme in Bahrain, and whether there is a need for further modifications before testing for efficacy in larger numbers.

1.6 Aims

- To conduct a systematic review of the literature to determine factors associated with LBP disability in non-Western cultures.
- To cross-culturally adapt self-report tools to use as outcome measures.
- To determine some factors associated with LBP disability in the Arab population of Bahrain.
- To explore the beliefs of Bahraini patients with LBP and their expectations of a PMP.
- To determine the feasibility and acceptability of a physiotherapist-led PMP for patients with LBP in Bahrain.

Chapter II: Factors associated with LBP disability in non-Western cultures: a systematic review

2.1 Introduction

LBP is a common cause of disability, participation limitation and reduced quality of life (Chapter 1). Pain and other biomedical factors, such as characteristics and duration of symptoms and clinical or radiological findings, do not fully explain LBP disability (see 1.1.2). Cognitions such as fear-avoidance, pain beliefs, attitudes to work, catastrophizing and other coping mechanisms, and psychological distress, depression and anxiety are associated with LBP disability and treatment outcome (see 1.4). Societal factors such as work status, and compensation are also related to LBP disability (see 1.3.3). Such psychosocial factors can inform LBP management choices (Hill et al., 2011; Ostelo et al., 2005; Truchon, 2001; Van Tulder et al., 2000) and modifiable factors may be addressed by LBP management programmes (Critchley et al., 2007; Machado et al., 2007; Mannion et al., 2001; Ostelo et al., 2005; Tavafian et al., 2011; Van Tulder et al., 2000; Woby et al., 2004).

2.1.1 Rationale

Most investigations of relationships between psychosocial factors and LBP disability have been conducted in Western populations (Crook et al., 2002; Hasenbring et al., 1994; Laisné et al., 2012; Linton, 2000; Pincus et al., 2002; Pincus et al., 2006; Van Der Hulst et al., 2005; Van Tulder et al., 2000). Health beliefs vary between cultures so it cannot be assumed that the same psychosocial factors are also relevant in non-Western cultures (Genêt et al., 2009; Hansson and Hansson, 2000; Sanders et al., 1992; Tavafian et al., 2011). This has implications for conducting and analysing cross-sectional surveys, and implementing LBP management strategies acknowledging psychosocial factors in non-Western countries. To date there is no systematic review investigating factors associated with LBP disability in non-Western populations. Therefore this review will inform the studies that follow in this PhD thesis (Chapters 3 and 4).

2.2 Aims

The aims of this systematic review were;

(1) To determine factors associated with LBP disability and;

(2) To determine predictors of LBP disability following intervention in non-Western populations.

2.3 Methods

2.3.1 Search strategy

Preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines were followed (Liberati et al., 2009). Inclusion and exclusion criteria (Table II-1) were formulated to address the objectives. The criteria took into consideration the Population, Intervention, Comparator to the intervention, Outcomes measures and Study design "PICOS" (Liberati et al., 2009).

Table II-1 Inclusion and exclusion criteria

	Inclusion Criteria	Exclusion Criteria
Population	Non-Western populations (outside of Europe, North America, Australia and New Zealand). Subjects over 18 years of age. Primary complaint of nonspecific chronic and/or ≥3 months LBP with or without leg symptoms.	Western populations (Europe, North America, Australia and New Zealand) Ethnic minorities living in Western countries Subjects under 18 years of age Study did not specify either "chronic" LBP or LBP for longer than 3 months Study addressed non-musculoskeletal pain, e.g. cancer Study did not differentiate chronic LBP from acute LBP, other musculoskeletal pain, or rheumatic pain, e.g. fibromyalgia. Did not exclude patients with specific causes of LBP such as inflammatory disease, back surgery, osteoporosis, fractures, other traumatic injuries and pregnancy.
Intervention	Conventional physiotherapy intervention, or physiotherapist-led multidisciplinary rehabilitation program aimed at LBP pain management.	Psychological treatment (e.g. CBT, counselling, or other) for LBP. Bio-medical interventions including drug trials, surgical trials and anaesthetics.
Comparator	Control group, conventional physiotherapy intervention, or multidisciplinary rehabilitation program aimed at LBP pain management.	Bio-medical interventions including drug trials, surgical trials and anaesthetics.

	Inclusion Criteria	Exclusion Criteria
Outcomes	At least one outcome that measures perceived disability. At least one outcome that measures a factor associated with disability (excluding pain, pain-related symptoms and quality of life). Calculates a statistical relationship between the measure of perceived disability and other measured variable using correlations or regression models to explain this relationship.	The study was excluded if it did not use a measure of perceived disability. If the study used a measure of perceived disability it was excluded if it only measured pain (e.g. pain duration, severity, distribution) and / or only quality of life. If the study used both types of outcome measures but did not statistically analyse their association using correlations or regression analyses.
Study Design	Cross-sectional surveys will be selected to determine factors associated with LBP disability. Randomized controlled studies (RCTs) and cohort studies will be selected to determine predictors of LBP disability following intervention.	Case studies.
Others	None.	No full-text in English. Authors of studies published in a language other than English and authors of posters from conference proceedings were emailed three times requesting a full-text English version. Responding and interested authors were emailed as reminder up to three times again.

Search terms and strategy were developed following the criteria, key words from previous reviews, consultation with the PhD supervisors (second reviewer DC, and third reviewer PW) and an Information Specialist. CINHAL, EMBASE, Medline, PsycINFO, SciVerse Scopus and Web of Science databases were searched for peer-reviewed articles published by 31st December 2012. Medical Subject Headings (MeSH) were exploded and explored as appropriate. Additional studies were identified by reviewing bibliographies of retrieved reviews and articles. The grey literature was explored through conference proceedings and contacting experts. Authors of non-English articles were contacted to provide English translations of their studies. The search terms are shown in Table II-2.

Table II-2 Search terms

Search terms						
Low back pain	Disability	Survey	Chronic	Behaviour	Psychosocial	Demographics
Back pain	Perceived disability	Questionnaire	Chronicity	Beliefs	Catastrophizing	Work
Spine	Determinants of disability	Cross-sectional		Attitudes	Coping	Return to work
Spinal pain				Perceptions	Kinesiophobia	Age
					Fear avoidance	Compensation
					Distress	Gender
					Anxiety	Social
					Depression	Social factors
						Income
						Ethnicity
						Education
						Health literacy

The search strategy using free-text tools is shown in Table II-3.

Table II-3 Search strategy

Search strategy
1. “Low back pain” OR “Back pain” OR “Spine” OR “Spinal Pain”
2. “Disability” OR “Perceived disability” OR “Determinants of disability” OR “disabil*”
3. “Survey” OR “Questionnaire” OR “Cross?sectional”
4. “Chronic*” OR “Chronicity”
5. “Behavio?r” OR “Belief” OR “Attitude” OR “Perception”
6. “Psychosocial” OR “Catastrophizing” OR “Catastrophiz*” OR “Coping” OR “Cop*” “Kinesiophobia” OR “Fear avoidance” OR “Distress” OR “Anxiety” OR “Depression”
7. “Demographics” OR “Work” OR “Return to work” OR “Age” OR “Compensation” OR “Gender” OR “Social” OR “Social factors” OR “Income” OR “Inequality” or “Ethnicity” or “Education” or “Health literacy”
8. #1 AND #2 AND #3 AND #4 AND #5
9. #1 AND #2 AND #3 AND #4 AND #6
10. #1 AND #2 AND #3 AND #4 AND #7

2.3.2 Data extraction

Results of regression models and correlation coefficients were extracted and tabulated according to prognostic factor for analysis, see

Appendix 1: Data Extraction Table. A strong correlation was considered ≥0.60, a moderate between 0.30 and 0.60 and a low correlation below 0.30 (Mâaroufi et al., 2007).

2.3.3 Methodological quality

Criteria developed by Van der Hulst et al., (2005) were used to assess the methodological quality as their criteria met the objectives of this review and allowed for different study designs (Altman, 2001; 2002; Côté et al., 2001; Van Der Hulst et al., 2005; van Der Windt, 2000), see Appendix 2: Criteria for Methodological Quality Assessment. Quality assessment was carried out by two reviewers (DM, DC) independently, findings were discussed, and disagreements were settled by a third reviewer (PW).

Cross-sectional studies were rated out of 14 points, and longitudinal studies out of 19 points. All three reviewers agreed studies had to score more than half of the items to qualify for moderate quality. Therefore cross-sectional studies scoring ≤7 points were considered of low quality, 8 – 11 points were moderate, and ≥12 were of high quality. Longitudinal studies scoring ≤9 points were considered low-quality, 10 – 14 points were moderate-quality, and ≥15 were high-quality.

The level of evidence was judged on criteria used in previous systematic reviews (Laisné et al., 2012). The evidence was considered *strong evidence* for consistent findings (≥75%) in at least 2 or more high-quality studies AND one moderate-quality or multiple low-quality studies, *moderate evidence* for findings in one high quality study AND at least one moderate-quality or multiple low-quality studies, and *weak evidence* for findings in only one high-quality study, two moderate-quality studies or multiple low-quality studies. *Inconclusive evidence* was defined for inconsistent findings (≤75%) or insufficient findings (only one moderate-quality or low-quality study). *No evidence* was defined for absence of data.

2.4 Results

2.4.1 Study selection

The database search retrieved 2,598 articles (Figure I-1). Following title and abstract scanning 444 studies were identified for full-text review, 93 studies were carried out in non-Western countries of which 18 articles were not in English. All authors were contacted. Four authors responded with English versions. Reference list searching reveled two potential studies,

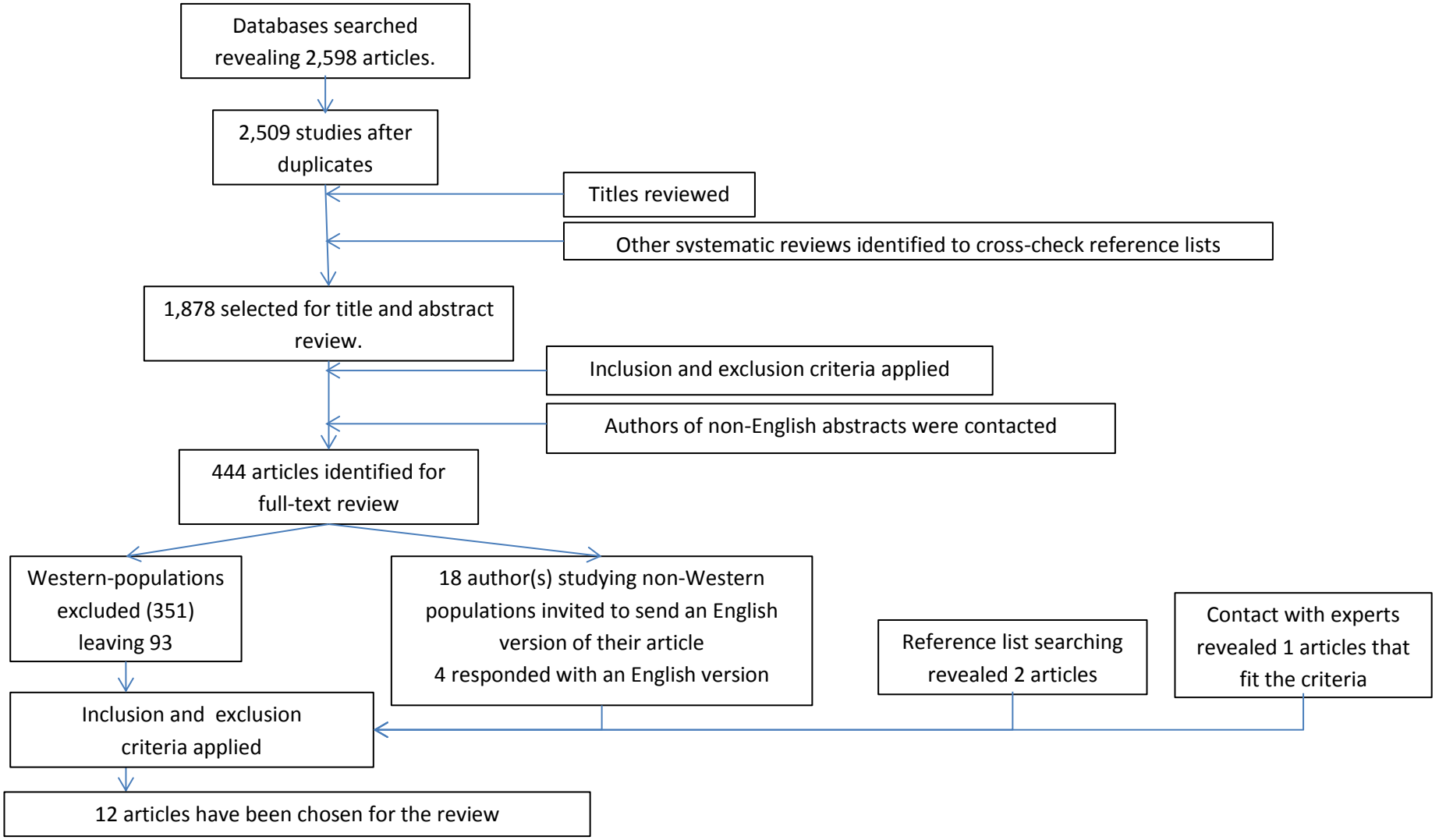

Figure II-I Search results

and contact with experts in the filed identified another. Twelve articles met inclusion and exclusion criteria and were chosen for the review.

2.4.2 Selected studies

Table II-4 contains a summary of the 12 studies.

Participants

Studies were set in 8 different countries (Table II-4); Argentina (1), Brazil (2), Hong Kong (3), Israel (1), Kuwait (1), Morocco (1), South Korea (1) and Turkey (2). All participants (n= 970) were patients, attending physiotherapy, physical medicine, rehabilitation, orthopaedic or neurosurgery outpatient departments.

Study Design

Eleven cross-sectional studies met the inclusion and exclusion criteria. Eight of the cross-sectional studies were cross-cultural translation and/or adaptation studies of self-report outcome measures.

No studies aiming to prospectively predictors of change for LBP disability met the criteria. However, one longitudinal study (Chan and Chiu, 2008) retrospectively assessing the predictive validity of FABs on changes in LBP disability following a physiotherapy rehabilitation program of strengthening, stretching and relaxation exercises met the inclusion and exclusion criteria and was included in the study. Authors collected data at baseline, 6 and 12 weeks. None of the other cross-sectional studies investigated the effects of an intervention.

Table II-4 Summary of selected studies

Authors	N = 970	Chronicity definition	Population and setting	Disability measure	Disability measure validated?	Factors measured for cross-sectional association
Al-Obaidi et al., 2000	63	>7 weeks	Kuwait OPC	DBQ	No	Spinal isometric strength
Chan & Chiu 2008	178	≥ 3 months	Hong Kong O, 1	PIS	No	FABQ Submaximal dynamic endurance test VAS
Cheng & Leung, 2000	56	≥ 6 months	Hong Kong O, 2	LBP-DS	CCTA – yes	Anxiety BPLOCQ Depressed mood Duration LBP-PS PCS
Ko et al., 2010	142	≥ 3 months	South Korea OPC O, 2	ODI	Yes	K-CPCI-42
Korkmaz et al., 2009	150	>1 months	Turkey O, 3	RMDQ	No	FABQ
Laufer et al., 2012	63	≥ 3 months	Israel OPC	ODI	No	FABQ
Lee & Ng., 1997	18	≥ 6 months	Hong Kong OPC	ODI	English Yes Chinese No	Erector spinae strength Trunk position and motion velocity

Authors	N = 970	Chronicity definition	Population and setting	Disability measure	Disability measure validated?	Factors measured for cross-sectional association
Maaroufi et al., 2007	76	≥ 3 months	Morocco OPC	RMDQ	CCTA – yes	Duration Fingertip-floor measurement Height Schröber's test VAS Weight
Nusbaum et al., 2000	30	≥ 3 months	Brazil OPC	RMDQ	CCTA – yes	Fingertip-floor measurement Qualitative pain scale VAS
Oliveira et al., 2008	40	≥ 3 months	Brazil OPC	RMDQ	Yes	MHLC
Scharovsky et al., 2008	132	≥ 3 months	Argentina O, 4	RMDQ	CCTA – yes	Active knee extension Total range of movement from T1 VAS
Sengul et al., 2011	22	≥ 3 months	Turkey O, 5	ODI	Yes	Balance control Walking
Authors	**N = 970**	**Chronicity definition**	**Population and setting**	**Disability measure**	**Disability measure validated?**	**Factors measured for predictive validity**
Chan & Chiu 2008	178	≥ 3 months	Hong Kong O, 1	PIS	No	FABQ

*methodological quality appraised out of 20 for longitudinal studies

BPLOCQ: Back Pain Locus of Control Questionnaire, CCTA: Cross-cultural translation and adaptation study, DBQ: Arabic version of the Roland-Morris Disability Questionnaire, FABQ: Fear-avoidance Beliefs Questionnaire, K-CPCI-42: Korean Chronic Pain Coping Inventory-42, LBPRS-DS: Low Back Pain Rating Scale: Disability Subscale, LBPRS-PS: Low Back Pain Rating Scale: Pain Intensity Subscale, MHLC: Mental Health Locus of Control, O: Other departments: 1: Attendees of a rehabilitation program, 2: Outpatient orthopaedic department, 3: Patients from physical medicine and rehabilitation department, 4: Attendees of a rehabilitation and therapeutic education centre, 5: Patients of a neurosurgery department, ODI: Oswestry Disability Index, OPC: Outpatient physiotherapy clinic(s), PCS: Pain Catastrophizing Scale, PIS: Physical Impairment Score, RMDQ: Roland-Morris Disability Questionnaire, VAS: Visual Analogue Scale.

2.4.3 Methodological quality of selected studies

Cross-sectional studies

Eleven cross-sectional studies were appraised against 14 items (Table II-5). Three studies were of low quality (Lee and Ng, 1997; Nusbaum et al., 2001; Sengul et al., 2011), five of moderate quality (Al-Obaidi et al., 2000; Cheng and Leung, 2000; Ko et al., 2010; Oliveira et al., 2008; Scharovsky et al., 2008) and three of high quality (Laufer et al., 2012; Mâaroufi et al., 2007).

Longitudinal study

The longitudinal study that retrospectively assessed for the predictive value of change in FABs for LBP disability (Chan and Chiu, 2008), was of moderate quality. The authors only collected short-term follow up (12 weeks) data and did not discuss attrition. Other methodological concerns that arose from the quality assessment procedure is discussed in the next section alongside the cross-sectional studies.

Study quality

All studies had well defined objectives. Eight had populations with clearly descried criteria and patient source. Definitions of chronicity varied from symptoms for more than one (Korkmaz et al., 2009) to six months (Cheng and Leung, 2000; Lee and Ng, 1997) (Table II-4). Only three studies reported their recruitment process (Korkmaz et al., 2009; Mâaroufi et al., 2007; Scharovsky et al., 2008). Studies were awarded a point for the usage of valid and reliable measures only if all measures satisfied this condition. In five studies, (Chan and Chiu, 2008; Korkmaz et al., 2009; Laufer et al., 2012; Mâaroufi et al., 2007; Oliveira et al., 2008) all measures were valid and reliable. The most commonly missed quality item was unvalidated questionnaires in the appropriate language. However, non-questionnaire based factors were also not validated such as electromyography procedures (Lee and Ng, 1997), qualitative pain and lumbar range of movement measurements (Nusbaum et al., 2001), and knee range of movement measurements (Scharovsky et al., 2008). All studies except two (Cheng and Leung, 2000; Oliveira et al., 2008) described a clear statistical plan to test their hypotheses. Five studies (Chan and Chiu, 2008; Ko et al., 2010; Korkmaz et al., 2009; Laufer et al., 2012; Mâaroufi et al., 2007) clearly identified procedures for verifying their data (item 19). Other studies did not clearly set as a predetermined correlation strength for their analyses (Al-Obaidi et al., 2000; Lee and Ng, 1997). Another two studies showed a bias towards reporting only high or significant correlations (Lee and Ng, 1997; Sengul et al., 2011). Four studies (Korkmaz et al., 2009; Mâaroufi et al., 2007; Oliveira et al., 2008; Scharovsky et al., 2008) had an adequate

Table II-5 Methodological quality assessment of selected studies

Study (score)	Al-Obaidi et al. (9)	Chan & Chiu (12*)	Cheng & Leung (8)	Ko et al. (10)	Korkmaz et al. (13)	Laufer et al. (12)	Lee & Ng (6)	Maaroufi et al. (13)	Nusbaum et al. (6)	Oliveira et al. (9)	Scharvosky et al. (10)	Sengul et al. (7)
1. The research question is well stated	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Patient selection												
2. The population is well identified	✔	✔	✔	✔	✔	✔	✔	✔	X	✔	✔	X
3. The inclusion and exclusion criteria are defined and appropriate	✔	✔	✔	X	✔	✔	✔	✔	X	X	✔	X
4. Participation rate is reported and appropriate	X	X	X	X	✔	X	X	✔	X	X	✔	X
Prognostic factors												
5. The methods used to measure the baseline prognostic variables are valid and reliable	X	✔	X	X	✔	✔	X	✔	X	✔	X	X

Study (score)	Al-Obaidi et al. (9)	Chan & Chiu (12*)	Cheng & Leung (8)	Ko et al. (10)	Korkmaz et al. (13)	Laufer et al. (12)	Lee & Ng (6)	Maaroufi et al. (13)	Nusbaum et al. (6)	Oliveira et al. (9)	Scharvosky et al. (10)	Sengul et al. (7)
6. The prognostic factor(s) is (are) measured in a standardized way	✔	✔	✔	✔	✔	✔	✔	X	✔	✔	X	✔
7. Other relevant prognostic factors are measured	✔	✔	✔	✔	✔	✔	X	✔	X	X	X	X
Interventions												
8. The intervention(s) is (are) explicitly described	N/A	✔	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9. The compliance is acceptable in all groups	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Outcome measurement												
10. The same data collection is used for all members of the cohort	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

Study (score)	Al-Obaidi et al. (9)	Chan & Chiu (12*)	Cheng & Leung (8)	Ko et al. (10)	Korkmaz et al. (13)	Laufer et al. (12)	Lee & Ng (6)	Maaroufi et al. (13)	Nusbaum et al. (6)	Oliveira et al. (9)	Scharvosky et al. (10)	Sengul et al. (7)
11. The methods used to measure the outcome are defined and measureable	✔	✔	✔	✔	✔	✔	X	✔	✔	✔	✔	✔
12. The methods used to measure the outcome are valid and reliable	X	X	X	✔	X	✔	X	✔	✔	✔	✔	✔
13. Percentage of follow-up is reported, explained and reasonable	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14. The duration of follow-up is adequate a) Was a short-term follow-up measurement performed? b) Was a long-term follow-up measurement performed?	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Study (score)	Al-Obaidi et al. (9)	Chan & Chiu (12*)	Cheng & Leung (8)	Ko et al. (10)	Korkmaz et al. (13)	Laufer et al. (12)	Lee & Ng (6)	Maaroufi et al. (13)	Nusbaum et al. (6)	Oliveira et al. (9)	Scharvosky et al. (10)	Sengul et al. (7)
Statistics												
15. The sample size provides adequate statistical power	X	X	X	X	✔	X	X	✔	X	✔	✔	X
16. Was the statistical methodology appropriate for the research question and study design?	✔	✔	X	✔	✔	✔	✔	✔	✔	X	✔	✔
17. Control for statistical significance	✔	✔	✔	✔	✔	✔	✔	✔	X	✔	✔	✔
18. Control for multicollinearity	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19. The results are verifiable from the data	X	✔	X	✔	✔	✔	X	✔	X	X	X	X

*methodological quality appraised out of 19 for longitudinal studies

sample size for the number of correlations they calculated. Seven of the studies (Al-Obaidi et al., 2000; Korkmaz et al., 2009; Laufer et al., 2012; Lee and Ng, 1997; Nusbaum et al., 2001; Oliveira et al., 2008; Scharovsky et al., 2008), did not discuss potential biases or limitations of their study designs and methodologies. Although this item was not a criterion on quality assessment appraisal tool, it is important to report to increase confidence in the studies' results and conclusions. Table II-5 shows a summary of the quality assessment of the 12 studies.

2.4.4 Disability measures

Six studies used the Roland-Morris Disability Questionnaire (RMDQ) (Al-Obaidi et al., 2000; Korkmaz et al., 2009; Mâaroufi et al., 2007; Nusbaum et al., 2001; Oliveira et al., 2008; Scharovsky et al., 2008), 4 studies used the Oswestry Disability Index (ODI) (Ko et al., 2010; Laufer et al., 2012; Lee and Ng, 1997; Sengul et al., 2011), one study used the Physical Impairment Score (Chan and Chiu, 2008) and another used the disability subscale of the Low Back Pain Rating Scale (Cheng and Leung, 2000) (Table 3). Three studies did not validate the tool in the language they were using (Al-Obaidi et al., 2000; Chan and Chiu, 2008; Korkmaz et al., 2009), one study mentioned it was validated but results were not published (Laufer et al., 2012) and one used a combination of validated English and unvalidated Chinese questionnaires (Lee and Ng, 1997). Four of the 6 studies with validated outcome measures were cross-cultural translation and/or adaptation studies aiming to validate their tools.

2.4.5 Cross-sectional evidence of association between biomedical factors and LBP disability

Table II-6 summarises all factors under their respective domains and levels of evidence.

Pain

Four studies measured pain intensity (Chan and Chiu, 2008; Cheng and Leung, 2000; Mâaroufi et al., 2007; Nusbaum et al., 2001) using the Visual Analogue Scale (VAS) (Chan and Chiu, 2008; Mâaroufi et al., 2007; Nusbaum et al., 2001) or the Low Back Pain Rating Scale: Pain Intensity Subscale (LBPRS-PS) (2000) . Moderate associations between pain intensity and disability were found in one high quality study (Mâaroufi et al., 2007) and one moderate quality study (Chan and Chiu, 2008). A high association between pain intensity and disability was found by one moderate quality study (Cheng and Leung, 2000). One low quality study (Nusbaum et al., 2001) found a non-significant low association for pain intensity (VAS) and disability and a non-significant high association for pain intensity and disability using an unvalidated qualitative pain scale. Therefore there was moderate evidence for at least a moderate association between pain and disability.

Table II-6 Cross-sectional evidence for association between factors and low back pain disability

	Factor	Outcome measure	Study	Association	Methodological Quality	Level of Evidence
Pain	Back pain	VAS	Chan & Chiu 2008	0.35**	Moderate	ME
			Maaroufi et al., 2007	0.320**	High	
			Nusbaum et al., 2000	0.24 NS	Low	
		LBPRS PS	Cheng & Leung, 2000	0.67***	Moderate	
		Qualitative pain scale	Nusbaum et al., 2000	0.76 NS	Low	
	Back pain (without leg pain)	LBPRS PS	Cheng & Leung, 2000	0.60***	Moderate	IE
	Leg pain	LBPRS PS	Cheng & Leung, 2000	0.57***	Moderate	IE
Characteristics of symptoms	Duration	Time (months)	Maaroufi et al., 2007	0.08 NS	High	ME
			Cheng & Leung, 2000	0.20 NS	Moderate	
Muscle strength	Extensors	Spinal extensors isometric strength at different angles using The Medx (Ocala, FL)	Al-Obaidi et al., 2000	NS at different angles	Moderate	IE
		Erector spinae strength at full trunk flexion using The MyoTrac2 EMG system (Thought Technology Ltd., New York)	Lee & Ng., 1997	0.56*	Low	

	Factor	Outcome measure	Study	Association	Methodological Quality	Level of Evidence
		Submaximal dynamic endurance test of lumbar paraspinals on a Lumbar Extension Device with EMG	Chan & Chiu 2008	0.11 NS	Moderate	
Range	Lumbar flexion	Schröber's test	Maaroufi et al., 2007	-0.21 NS	High	IE
		Finger to floor		0.11NS		
		Finger to floor	Nusbaum et al., 2000	0.24 NS	Low	
		Total range of movement from T1	Scharovsky et al., 2008	-0.38**	Moderate	
	Active knee extension	Digital inclinometry	Scharovsky et al., 2008	0.12 NS	Moderate	IE
Velocity	Lumbar flexion	The Back Tracker (Isotechnologies Inc., Hillsborough, NC 27278)	Lee & Ng., 1997	-0.55*	Low	IE
	Lumbar extension			-0.66*		IE
Balance control [a]	Reaction time	Forward reaction time	Sengul et al., 2011	0.33 NS	Low	IE
		Backward reaction time		No association		
		Right reaction time		0.25 NS		
		Left reaction time		No association		
		Composite reaction time		0.40 NS		
	Balancing movement velocity	Velocity	Sengul et al., 2011	Not reported	Low	NE

	Factor	Outcome measure	Study	Association	Methodological Quality	Level of Evidence
	Maximum excursion	Maximum forward excursion	Sengul et al., 2011	-0.63**	Low	IE
		Maximum backward excursion		-0.49**		
		Maximum right excursion		-0.68**		
		Maximum left excursion		No association		
		Maximum composite excursion		-0.54**		
	Balancing end point	Forward balancing end point	Sengul et al., 2011	No association	Low	IE
		Backward balancing end point		No association		
		Right balancing end point		-0.47*		
		Left balancing end point		No association		
		Forward directional control		-0.50*		
		Composite directional control		-0.51*		
		Sit to stand		-0.42*		
		Step up and over		No association		
Walking characteristics [a]	Steps	Step width	Sengul et al., 2011	0.67 NS	Low	IE
	Step	Step length		-0.66**		
	Speed	Speed		-0.71**		

	Factor	Outcome measure	Study	Association	Methodological Quality	Level of Evidence
Patient's physical characteristics	Height	cm	Maaroufi et al., 2007	-0.16 NS	High	WE
	Weight	kg	Maaroufi et al., 2007	-0.08 NS	High	
Beliefs	Fear avoidance beliefs	FABQ	Chan & Chiu 2008	0.45**	Moderate	SE
		FABQ-PA	Korkmaz et al., 2009	0.21*	High	
			Laufer et al., 2012	0.40**	High	
		FABQ-W	Korkmaz et al., 2009	0.28**	High	
			Laufer et al., 2012	0.42**	High	
	Catastrophizing	PCS	Cheng & Leung, 2000	0.63**	Moderate	IE
Locus of control	Internal LOC	BPLOCQ	Cheng & Leung, 2000	-0.33***	Moderate	IE
		MHLC	Oliveira et al., 2008	0.58***	Moderate	
	Others LOC	BPLOCQ	Cheng & Leung, 2000	0.31*	Moderate	IE
		MHLC	Oliveira et al., 2008	-0.33 *	Moderate	
	Chance LOC	BPLOCQ	Cheng & Leung, 2000	0.40**	Moderate	WE
		MHLC	Oliveira et al., 2008	0.35*	Moderate	
Coping	Guarding	K-CPCI-42	Ko et al., 2010	0.51**	Moderate	IE
	Resting			0.28**		IE
	Asking for assistance			0.40**		IE
	Relaxation			0.24**		IE

	Factor	Outcome measure	Study	Association	Methodological Quality	Level of Evidence
	Task persistence			-0.16 NS		IE
	Exercise and stretch			0.18**		IE
	Coping self-statements			0.27**		IE
	Seeking social support			0.40**		IE
Psychological distress	Anxiety	VAS	Cheng & Leung, 2000	0.17 NS	Moderate	IE
	Depressed mood			0.23*		IE

Factors are labelled in **red** are classified under the **bio-medical domain**, and those in **green** to the **psychosocial domain**.

*P ≤0.05, **P ≤ 0.01, ***P ≤ 0.001, NS: not significant or no significance level reported, [a] Balance Master System (version 8.0, NeuroCom Inc, USA), BPLOCQ: Back Pain Locus of Control Questionnaire, FABQ: Fear-avoidance Beliefs Questionnaire, K-CPCI-42: Chronic Pain Coping Inventory-42, LBPRS PS: Low Back Pain Rating Scale: Pain Intensity Subscale, MHLC: Mental Health Locus of Control, PCS: Pain Catastrophizing Scale, VAS: Visual Analogue Scale

Levels of evidence; SE: *strong evidence* for consistent findings (≥75%) in at least 2 or more HQ studies AND one MQ or multiple LQ studies, ME: *moderate evidence* for findings in one HQ study AND at least one MQ or multiple LQ study, WE: *weak evidence* for findings in only one HQ study, two MQ studies or multiple LQ studies, IE: *inconclusive evidence* was defined for inconsistent findings (≤75%), insufficient findings (only one MQ or LQ study), or contradictory findings, NE: *no evidence* was defined for absence of data on the association within multivariate biopsychosocial models.

One study of moderate quality (Cheng and Leung, 2000) assessed back pain and leg pain separately using the LBPRS-PS and found high and moderate associations respectively with disability. Evidence from one study was inconclusive.

Characteristics of symptoms

Duration of low back pain symptoms was the only symptom characteristic compared with disability in two studies (one high quality (Mâaroufi et al., 2007) and one moderate quality (Cheng and Leung, 2000)), both reporting a weak non-significant correlation. Therefore the level evidence of evidence was determined to be moderate.

Muscle strength

Two moderate quality studies (Al-Obaidi et al., 2000; Chan and Chiu, 2008) report non-significant weak correlations, and a third study of low quality study (Lee and Ng, 1997) a moderate association between lumbar extensor strength and disability. The evidence was found inconclusive.

Range of movement

Three studies measured association of lumbar flexion with disability, using Schröber's test (Mâaroufi et al., 2007), Finger-to-floor (Mâaroufi et al., 2007; Nusbaum et al., 2001) and total range of movement from T1 (Scharovsky et al., 2008). Non-significant weak associations between lumbar flexion and disability were found in one high quality study (Mâaroufi et al., 2007), and one low quality study (Nusbaum et al., 2001). A moderate quality study (Scharovsky et al., 2008) found a moderate correlation for lumbar flexion. The evidence was determined to be inconclusive. Additionally, inconclusive evidence for a non-significant low association for active knee extension and disability was found from a study of moderate quality (Scharovsky et al., 2008).

Velocity of lumbar movement

One low quality study (Lee and Ng, 1997) measured velocity of lumbar flexion and extension and found a moderate association with disability and was determined inconclusive.

Balance and walking characteristics

Evidence was inconclusive for balance and walking characteristics from the findings of one low quality study (Sengul et al., 2011). Balance characteristics, measured were: reaction time (non-significant association), maximum excursion (moderate association for all movements except left), balancing end point (moderate association for right-sided only), directional control (moderate association), sit to stand (moderate association) and step-up-and-over (no

association). Walking characteristics (step width, step length and speed) all correlated highly with disability.

Patients' physical characteristics

One high quality study (Mâaroufi et al., 2007) measured association between height and weight with disability and found both to have low (non-significant) associations. These findings were considered weak evidence for no association.

2.4.6 Cross-sectional evidence of association between psychosocial factors and LBP disability

Fear-avoidance beliefs

Three studies used the Fear-avoidance Beliefs Questionnaire (FABQ) to measure fear-avoidance beliefs (Chan and Chiu, 2008; Korkmaz et al., 2009; Laufer et al., 2012). Two were of high quality (Korkmaz et al., 2009; Laufer et al., 2012) and one of moderate quality (Chan and Chiu, 2008). Two studies found moderate correlations between disability and fear-avoidance beliefs; Chan & Chiu (2008) for the entire FABQ score, and Laufer et al., (2012) for both the work and physical activity subscales. Korkmaz et al., (2009) found low correlations between disability and both work and physical activity subscales. Therefore there is strong evidence for at least a low association between fear-avoidance beliefs and disability.

Catastrophizing

One moderate quality study (Cheng and Leung, 2000) measured the association between catastrophizing using the Pain Catastrophizing Scale and disability. They found a high correlation between catastrophizing and disability. However, evidence from one study was considered inconclusive.

Locus of control (LOC)

Two studies of moderate quality measured internal, external and chance LOC, using the Mental Health Locus of Control (Oliveira et al., 2008) and the Back Pain Locus of Control Questionnaires (Cheng and Leung, 2000). For internal LOC, Oliveira et al., (2008) found a moderate positive association and Cheng & Leung (2000) found a moderate negative association. For external LOC, Oliveira et al., (2008) found a moderate negative association and Cheng & Leung (2000) found a moderate positive association. Both studies found a moderate positive association to chance LOC. The level of evidence for internal and external LOC was considered inconclusive for two contradictory studies and weak for evidence of a moderate association between chance locus-of-control and disability.

Coping

The evidence for coping strategies was inconclusive. They were measured by one moderate quality study (Ko et al., 2010) using the Korean Chronic Pain Coping Inventory-42. The authors found a moderate association between disability and guarding, asking for assistance, and seeking social support. There was a low association for resting, relaxation, exercise and stretching, and coping self-statements. Additionally they found an inverse, non-significant, association with task persistence.

Psychological distress

Psychological distress was measured by one moderate quality study using a VAS for anxiety and depressed mood (Cheng and Leung, 2000). There was a non-significant low association between disability and anxiety, and a low association between disability and depressed mood, therefore evidence was considered inconclusive.

2.4.7 Evidence for predictors of change in LBP disability

Chan and Chiu (2008) was the only longitudinal study investigating the predictive power of baseline fear-avoidance beliefs on changes in disability. The study found a low association ($r = -0.22$, $p < 0.01$) between FABQ and change in disability at 6 weeks, and moderate association ($r = -0.35$, $p < 0.01$) at 12 weeks. The study also found that baseline FABQ predicted 5% ($p < 0.01$) of the variance in disability 6 weeks post-treatment, and 12% ($p < 0.05$) at 12 weeks post-treatment. The evidence for fear-avoidance beliefs predicting change in disability is inconclusive because it was reported from only one moderate quality study.

2.5 Discussion

2.5.1 Summary of findings

The systematic review identified twelve studies from eight different non-Western countries measuring associations between biomedical or psychosocial factors and self-report LBP disability. Eleven studies were cross-sectional and one was a longitudinal study (Chan and Chiu, 2008). The factors with strongest evidence for cross-sectional association with LBP disability were fear-avoidance beliefs followed by pain intensity and symptom duration, the majority of cross-sectional evidence for an association with LBP disability was determined inconclusive because it was found in only one study. Additionally, only one study retrospectively assessed one variable for its predictive power of change in LBP disability and the evidence was therefore determined to be inconclusive. A summary of the main findings is provided in Table II-7.

Table II-7 Summary of main findings

Factor	Cross-sectional Association	Level of Evidence
Fear-avoidance beliefs	Low	Strong
Pain intensity	Moderate	Moderate
Symptom duration	No association	Moderate
Physical characteristics (weight and height)	No association	Weak
Chance Locus of Control	Moderate	Weak

2.5.2 Participants

Culture

Studies from eight non-Western cultures across South America, the Middle East, North Africa and Asia were included to address this review's objectives. The dominance of the biomedical over biopsychosocial approach to LBP research in these cultures is evident from the factors in this review. There is a lack of validated LBP self-report outcome measures in non-Western languages (Costa et al., 2007a). The relationship between these two issues could be related; however it is difficult to determine causality.

Results, particularly of psychosocial constructs that are influenced by religion, cultural values and socioeconomic factors are expected to vary (Campbell et al., 2009; Marks, 1998). Non-Western countries include many diverse cultures. It should not be expected that different non-Western cultures all have similar factors associated with disability. Much more research is necessary to identify consistent factors associated with disability in particular non-Western cultures. A further complicating issue is the presence of "Western culture" in these non-Western countries, however it is largely a "Western influence" rather than the dominant culture (Anderson, 2007; Spielberger, 2004).

Studies on ethnic minorities in Western countries were excluded in attempt to reduce the impact of Western influences and acculturation on the biopsychosocial factors of interest (LaFromboise et al., 1993; Landrine and Klonoff, 2004). Western countries, similarly to "non-Western" countries, are also expected to differ from each other and have varying sub-cultures. The purpose of this grouping was two-fold; primarily to refer to a particular set of social norms, values and beliefs, and secondary to the abundance of research exploring LBP disability in these countries (Sanders et al., 1992; Tavafian et al., 2011).

Participants

Symptom duration varied between greater than one and six months. Variation in defining the duration threshold for chronic non-specific LBP has been documented elsewhere (McCarthy et al., 2004; McIntosh et al., 2000). All of the studies identified their patients as "chronic" and/or with symptoms for more than three months in their inclusion and exclusion criteria. Additionally, all participants were LBP patients seeking treatment at outpatient settings.

2.5.3 Disability measures

The RMDQ (Al-Obaidi et al., 2000; Korkmaz et al., 2009; Mâaroufi et al., 2007; Nusbaum et al., 2001; Oliveira et al., 2008; Scharovsky et al., 2008) and ODI (Ko et al., 2010; Laufer et al., 2012; Lee and Ng, 1997; Sengul et al., 2011) were used in ten of twelve studies. The RMDQ and ODI correlate well, have similar psychometric properties and either can be used where a valid translation exists (Roland and Fairbank, 2000). Two studies did not use a validated RMDQ in the target language (Al-Obaidi et al., 2000; Korkmaz et al., 2009) decreasing confidence in these studies' findings. Two other studies used different tools, Physical Impairment Score (Chan and Chiu, 2008) and the LBPS-DS (Cheng and Leung, 2000). Using common, valid and reliable tools standardizes data collection and allows direct comparison of results (Costa et al., 2007a; Deyo et al., 1998). Despite the benefits of standardization, the experiences described in disability measures designed for western populations may not be the most common experiences of daily life in another culture (Costa et al., 2007a; Maher et al., 2007). With this in mind, none of the studies included in this review used a self-report disability outcome measure developed specifically for their target population. A common and acceptable method to improve the acceptability and relevance of items on self-report outcome measures is through cross-cultural translation and adaptation (Beaton et al., 2000).

2.5.4 Cross-sectional evidence of association with LBP disability

There was strong evidence for at least a low association between fear-avoidance beliefs and disability from two high quality (Korkmaz et al., 2009; Laufer et al., 2012) and one moderate quality study (Chan and Chiu, 2008). Two other non-western population studies (Cai et al., 2007; Pensri et al., 2010b), excluded for the inclusion of acute LBP patients, also found at least a low cross-sectional association with the FABQ subscales. A review of predominantly Western studies found moderate evidence for association of fear-avoidance beliefs and back pain and disability (Linton, 2000).

Moderate evidence was found for at least a moderate cross-sectional association between pain intensity and disability. Similar results have been found in non-Western populations with

other chronic pain conditions (Asghari, 2011; Thumboo et al., 2002). Reviews of Western LBP populations have similar findings. Truchon et al., (2001) found that there was a weak relationship between persisting pain and persisting disability. Another review (Turner et al., 2006) found consistent evidence for a relationship between pain intensity and disability. Greater self-reported pain intensity and greater number of sites were associated with greater disability and non-return to work. This review only included only one study of moderate quality (Cheng and Leung, 2000) that looked specifically at the site of pain (back pain and back-related leg pain exclusively of each other) therefore there was inconclusive evidence to determine the association between the site of pain and disability.

Moderate evidence was also found for no cross-sectional association between duration of symptoms and disability. Pain duration was also found to have no association in non-Western studies of chronic lower limb pain (Thumboo et al., 2002), concurrent LBP (Pensri et al., 2010b) and Western reviews of chronic LBP (Turner et al., 2006; Van Der Hulst et al., 2005). Conversely, higher interference of pain with activities is associated with negative outcomes such as reduced treatment success (Van Der Hulst et al., 2005). LBP histories measured by numbers of previous episodes and/or frequency of consultations have also shown a relationship with LBP disability (Gesztelyi and Bereczki, 2006; Truchon, 2001). The method of measuring instances of pain intensity and medical history could affect its level of association with disability. Distress has been shown to predict both disability (Burton et al., 1995; Linton, 2000; Pincus et al., 2002) and consultations (Johansson and Lindberg, 2000; Waxman et al., 1998); therefore an association between the two to the above reasons is expected.

This review found weak evidence for no association with physical characteristics such as weight and height from one high quality study (Mâaroufi et al., 2007). Similar results for weak evidence based on one study were found by Vand der Hulst et al., (2005). Non-Western studies that have assessed acute and chronic LBP patients (Cai et al., 2007) and chronic lower limb pain (Thumboo et al., 2002) also found a no association between these physical characteristics and disability. A Western review of 65 studies reported that only 32% of included studies report an association, albeit weak, between weight and LBP and therefore evidence was weak for a weak association (Leboeuf-Yde, 2000). The expectation of a weak association between LBP disability and these physical factors might be the reason for the limited amount of prospective studies assessing for this relationship in this review and others (Van Der Hulst et al., 2005). Although there is weak evidence for no association, a meta-analysis found a strong association between being overweight and seeking care for LBP (Shiri et al., 2010). Being overweight increases the likeliness of other lifestyle related diseases and therefore individuals

are more likely to seek help (Leboeuf-Yde, 2000). It is important to distinguish between these two issues.

There was inconclusive evidence for internal and external LOC, however there was a weak level of evidence for a moderate cross-sectional association between chance LOC and disability. The evidence comes from two moderate quality studies (Cheng and Leung, 2000; Oliveira et al., 2008). A western systematic review (Crook et al., 2002) found that LOC measures were predictive of "not-working" and hence disability in prospective studies. This evidence came from one study, and they found it was related to low internal LOC and low control over work. Other Western reviews (Truchon, 2001) also found that LOC results were contradictory and suggested more research is necessary before determining its cross-sectional association and prognostic relationship with disability. Van der Hulst et al., (2005) suggested results of LOC subscales may vary due to the different participants' populations and their respective beliefs. The internality or externality of LOC could be influenced by cultural values religious beliefs, and social factors similarly to other psychological constructs (Campbell et al., 2009; Marks, 1998).

2.5.5 Evidence for predictors of change in LBP disability

With regards to identifying predictors of LBP disability, this review found inconclusive evidence for fear-avoidance beliefs as a greater predictor of change in disability compared to pain and endurance. Similarly, two Western reviews found fear-avoidance beliefs to be predictive of persistent disability based on findings from one study (Crook et al., 2002; Pincus et al., 2002). Another review of fear-avoidance beliefs and LBP prognosis, did not find FABs to be a strong predictor of LBP disability (Pincus et al., 2006). Although the evidence for a low cross-sectional association has been found in this review and others, evidence for fear-avoidance beliefs as a predictor of change in LBP disability seems limited. The review by Pincus et al., (2006) expanded their review to include studies using outcome measures associated with fear such as pain-related anxiety, health anxiety and general anxiety and was yet to find strong evidence for FABs as predictors of change in LBP disability. Another reason could be because studies explain the variance in disability or change in disability jointly with other psychosocial variables such as catastrophizing, making it difficult to determine the unique contribution of fear-avoidance beliefs to disability. Furthermore, a more recent review (Wertli et al., 2014d) found FABs to be less predictive of LBP disability that has lasted for longer than 3 months, following a sub-group analysis of their findings by LBP duration. This indicates that the strength of FABs as a predictor of LBP disability could depend on the duration of pain, and could be a reason why this review did not find it to be a predictor of LBP disability, nor found a larger number of studies measuring this relationship at 3 or more months of LBP.

2.5.6 Inconclusive evidence

The review determined most of the evidence found for this study as inconclusive. As previously discussed, this was mostly because the factor measured was reported in only one study, or inconsistent findings (≤75% of the studies reporting the same result). The reviewers felt that it was important for factors to be included in the review regardless of the number of studies measuring it and regardless of methodological quality to present the reader with an adequate overview of variables being explored in non-Western countries. The usage of a pre-determined hierarchy of evidence allowed the presentation of this evidence and prevented the potential bias of eliminating it (Laisne et al., 2012). The reviewers were also cautious to draw conclusions from one study, regardless of methodological quality, because as discussed under section 2.5.2 non-Western countries consist of many countries and cultures that vary between each. Therefore, it would be difficult to justify how a relationship explored between LBP and one factor in one culture could be generalized to other non-Western countries.

2.5.7 Limitations

The inclusion and exclusion criteria could have limited the number of studies for this review. This could be the reason for a small number of studies per factor; hence much evidence was inconclusive. Only full text English articles were included in this review. Corresponding authors of non-English articles were contacted for English translation in efforts to minimise a language bias. The author acknowledges that restricting the study's inclusion criteria to publications in the English language could have biased the results of the review. There are potentially more appropriate studies from non-Western cultures not published in English, however this criterion due to the limited resources to the researcher and team. Also, restricting statistical analyses to correlations and regression modelling was a reason for the exclusion of several studies. However, this exclusion criterion allowed for the comparison of a specific type of statistical relationship of LBP disability to other factors across the studies, and inform the rest of this PhD thesis.

None of the studies assessed work-related factors. A series of studies on Thai workers with LBP (Janwantanakul et al., 2009) and other lower limb pain (Janwantanakul et al., 2008; Pensri et al., 2010a) found that work-related factors and job perceptions were associated with musculoskeletal complaints. Such work-related factors affected the Thai workers more than other psychosocial constructs due expected cultural roles and expectations. These studies were excluded for their inclusion of concurrent LBP regardless of the duration of symptoms. This study used unvalidated self-report outcomes for this population which further decreases the confidence in its results. However the importance of addressing work-related factors is

seen in other excluded studies (Diaz-Ledezma et al., 2009; Genêt et al., 2009; Hansson and Hansson, 2000; Sanders et al., 1992) comparing LBP patients from several cultures found that work-related factors differed across countries due to socioeconomic backgrounds, workers' compensation schemes, or previous history of LBP. Such factors are expected to differ between cultures based on such findings and some understanding of how culture can influence such factors (Davidhizar and Giger, 2004; Edwards et al., 2001; Sanders et al., 1992). For example, depression was seen as a larger risk factor for unemployment in an Australian sample of chronic pain patients compared to physical disability and self-efficacy in Brazil (Sardá Jr et al., 2009). Furthermore, Western studies have shown that factors such as job-type, time off-work, and workers' compensation (Crook et al., 2002; Laisné et al., 2012; Linton, 2001; Ostelo and de Vet, 2005) or work-related beliefs (Briggs et al., 2010; Buchbinder et al., 2001b; Burton et al., 1995; Jensen et al., 1994b; Turner et al., 2006; Turner et al., 2000b) are important predictors of LBP disability and outcomes. The lack of studies addressing work-related factors and disability in non-Western cultures has limited this review from concluding on the strength of association between them and LBP disability.

2.5.8 Clinical implications and recommendations for further research

The findings of this study have given rise to suggestions for further research. First of all, it is recommended that studies explore associations between work-related outcomes and LBP disability (see 2.5.6) to help inform strategies aimed at improving return to work in non-Western cultures. Secondly, it is recommended that existing self-report outcome measures are methodically cross-culturally translated, adapted and validated for their targeted patient population. Further research should be aimed at the exploration of cross-sectional relationships, using the cross-culturally translated and adapted outcomes, between LBP disability and other factors in non-Western cultures.

PMPs in non-Western cultures have been developed based on findings from Western studies, and have been effective in reducing LBP disability (Cakmak et al., 2004; de Góes Salvetti et al., 2012; Tavafian et al., 2011; Yang et al., 2010). This encourages further the use of Western-developed programmes in the non-Western world. However, baseline associations to LBP disability or post-intervention analyses to determine predictors of change were not commonly measured. It is recommended that such analyses are carried out to add to the available evidence base and confirm inconsistent findings.

2.6 Conclusions

The findings have implications for implementing LBP PMPs acknowledging psychosocial factors in non-Western cultures. The evidence found for fear-avoidance beliefs, pain intensity and duration of symptoms in non-Western studies is similar to those found in reviews with mainly Western studies. With this review's results and limitations in mind; the successful reduction of LBP disability in some non-Western studies encourages the use of PMP developed in the West. It is important to note that there was inconclusive evidence for the majority of the identified factors due to the lack of studies meeting this review's criteria or contradictory beliefs between different cultures. The results of this study encourage further exploration of psychosocial factors in non-Western cultures to facilitate the development of culturally-specific pain management approaches.

2.7 Chapter summary

Findings from the literature review (Chapter 1) showed that psychosocial factors such as pain-related beliefs, attitudes to work, coping mechanisms and psychological distress are related to negative LBP outcomes, and have been used to inform LBP management choices. Most investigations of these investigations have been conducted with Western populations. Health beliefs vary between cultures so it cannot be assumed that findings from Western settings are also relevant elsewhere. The objectives of the systematic review was to determine factors associated with LBP disability, and any predictors of change in LBP disability in non-Western populations. Databases were searched for articles up to December 2012. Data was extracted for analysis and quality assessment was carried out by two researchers to determine the strength the findings. Eleven cross-sectional and one retrospective longitudinal study from eight countries were selected. Three had low, six moderate and three high quality methodological scores. LBP disability was compared with biomedical factors (such as pain characteristics, muscle strength, range, and patients' physical characteristics) and psychosocial factors (health beliefs, locus of control, coping strategies and psychological distress). Evidence was strong for fear-avoidance beliefs having a low cross-sectional association with LBP disability, but inconclusive for predicting changes in LBP disability. Evidence was moderate for a moderate cross-sectional association for LBP disability with pain intensity and no cross-sectional association with symptom duration. Evidence was weak for moderate cross-sectional association with chance locus of control. These findings are similar to reviews of mainly Western studies. However, this review was limited because of the small number of studies and studies did not include work-related or other social factors. The findings suggest further research is necessary to determine factors cross-sectionally associated with and predictors of

LBP disability in non-Western cultures using well-translated culturally-appropriate self-report outcomes. The similarities between these findings and Western literature also encourage the use of Western-developed PMPs in non-Western settings.

Chapter III: Translation, Cross-cultural Adaptation and Psychometric Properties of Self-report Outcome Measures

3.1 Introduction

3.1.1 Translation and cross-cultural adaptation

Self-report outcome measures are commonly used in healthcare research and clinical practice. They are easy to administer, low cost and able to inform the researcher or clinician of patient's self-perceptions. Most self-report questionnaires used in healthcare are developed in English-speaking countries (Beaton et al., 2000; Costa et al., 2007a; Guillemin et al., 1993). Guidelines have been recommended for producing a questionnaire for a new country or culture, with or without the need to translate into a different language (Beaton et al., 2000; Guillemin et al., 1993; Hendricson et al., 1989). These guidelines aim to ensure equivalence between the original and target versions of the questionnaire. The guidelines acknowledge the need for cultural adaptation in addition to the linguistic translation to maintain conceptual equivalence across different version of a questionnaire and maintain confidence in the use of the questionnaire.

Translation and cross-cultural adaptation, is suggested following the examination of the source language or culture (where it was developed) and target language or culture (where it is intended for use next). The source language and culture for most outcome measures for LBP is the English language for English-speaking cultures (Costa et al., 2007a). In the context of this study, the target population is Arabic-speaking LBP patients in Bahrain. The guidelines strongly recommend cross translation and cultural adaptation in this case for the application of a questionnaire in a different culture, language and country (Guillemin et al., 1993).

The guidelines by Beaton et al., (2000) were produced following a review of cross-cultural adaptation in medical, sociological and psychological literature. They aim to maximize semantic, idiomatic, experiential and conceptual equivalence between the source and target versions. This includes the adaptation of the questionnaire's items, instructions and the response options. The process does not guarantee the retention of the psychometric properties of the source version at item or scale level. The guidelines recommend examination of the psychometric properties in the new version. Cultural norms might mean the target culture could approach a concept or an activity differently to the source culture. In this case, the target culture would respond to an item differently than expected. Therefore, the

psychometric properties of the new questionnaire should be tested after translation and adaptation.

3.1.2 Self-report outcome measures for low back pain

The availability of Arabic self-report outcome measures for LBP

Costa et al., (2007a) found two LBP-specific questionnaires translated and adapted into Arabic (Guermazi et al., 2005; Mâaroufi et al., 2007). Further inspection of the outcome measures revealed one to be a Moroccan version of the RMDQ (Mâaroufi et al., 2007) and another to be a Tunisian version of the Oswestry Disability Index (ODI) (Guermazi et al., 2005). Arabic dialects of North Africa may contain colloquialisms that are specific to the targeted culture and not the Arabic language. Modern Standard Arabic (Arabic) is the modern form of literary Arabic, used in official written documents, the media and public speaking in the Middle East and North Africa (Abboud and McCarus, 1983; Ryding, 2005). Validated and reliable versions of the Arabic Fear-avoidance Beliefs Questionnaire (FABQ, includes work (FABQ-w) and physical activity (FABQ-pa) subscales) (Laufer et al., 2012) (see 1.4.2) and the Hospital Anxiety and Depression Scale (HADS) which includes anxiety (HADS-anx) and depression (HADS-dep) subscales (El-Rufaie and Absood, 1995; El-Rufaie and Absood, 1987) (see 1.4.4) are available. To date, there are no valid and reliable LBP-specific outcome measures in Arabic to measure perceived LBP disability, beliefs about the inevitable consequences of back pain or assess coping strategies.

The RMDQ is a condition specific, patient reported outcome commonly used to measure LBP disability in research and clinical practice (Costa et al., 2007a; Müller et al., 2004; Ostelo et al., 2005). (See: Appendix 3: The Roland-Morris Disability Questionnaire.) It was developed from the Sickness Impact Profile. Statements were chosen to cover multiple aspects of daily living and the phrase “because of my back” was added to each statement to specify that the limitation described was due to back problems (Roland and Morris, 1983). The English RMDQ (EnRMDQ) has adequate reliability, validity and responsiveness (Riddle et al., 1998; Roland and Morris, 1983; Stratford et al., 1998). Additionally, it is simple to understand and complete, therefore guidelines have recommended its use with LBP patients (Bombardier, 2000; Roland and Fairbank, 2000).

The BBQ is a condition specific, patient-reported outcome used to measure attitudes and beliefs concerning the future consequences of LBP, with regards to recovery and return to work (Symonds et al., 1996). (See: Appendix 4: Back Beliefs Questionnaire.) The English BBQ (EnBBQ) consists of an inevitability subscale (9 items) and five statements used as distractors

(Symonds et al., 1996). The scale has shown good reliability and validity (Chen et al., 2011; Symonds et al., 1996).

The CSQ is frequently used to measure coping in chronic pain patients. (See: Appendix 5: Pain Coping Strategies Questionnaire.) The questionnaire contains items patients with chronic pain commonly use to describe their coping experiences (Rosenstiel and Keefe, 1983). The English CSQ (EnCSQ) consists of 44 items that make up 7 subscales with 7 items each, and an additional 2 items to measure overall effectiveness of perceived ability to control and decrease pain using the strategies endorsed. The scale has shown good reliability and validity (Main and Waddell, 1991; Rosenstiel and Keefe, 1983; Verra et al., 2006).

Psychometric testing of the translated and cross-culturally translated questionnaires

Guidelines by Beaton et al., (2001) recommend that after translation and adaptation, that the psychometric properties of the new versions are investigated to ensure that they demonstrate the measurement properties for their intended application. The RMDQ, BBQ and CSQ have all shown good reliability and validity in previous studies (see above). The Arabic versions will be examined for item-level and item-to-scale correlations by calculating items' contribution towards internal consistency and possible item redundancy. They will be also tested for both score and item-level characteristics of reliability, such as short-term test re-test reliability and finally for score-level validity using constructs validity.

Construct validity, whether an outcome measure correlates appreciably with dimensions it is postulated to measure (Laufer et al., 2012; Mâaroufi et al., 2007; Terwee et al., 2007), will be examined because there is no valid and reliable "gold standard" measure designed to evaluate self-reported LBP disability, beliefs or coping strategies in Arabic. The RMDQ intends to assess LBP disability in terms of pain-related limitations and disabilities. Moderate correlations (0.30-0.60) to pain intensity (VAS) have been observed in the literature (Bejia et al., 2005; Kovacs et al., 2002; Küçükdeveci et al., 2001; Mâaroufi et al., 2007). The FABQ subscales measure two of the dimensions the ArBBQ postulates to measure: (1) pain beliefs and work (FABQ-w), and (2) pain beliefs and physical activity (FABQ-pa). Previous studies have found low to moderate inverse relationships between FABQ subscales and BBQ (Chen et al., 2011). Studies have shown low to moderate correlations between CSQ subscales and symptoms of depression, distress and anxiety (Jensen et al., 1991; Keefe and Williams, 1990; Main and Waddell, 1991; Tan et al., 2001).

3.1.3 Rationale

The review in Chapter 1 has shown that cognitions such as fear-avoidance, beliefs and attitudes about back pain, catastrophizing and other unhelpful coping mechanisms, and psychological distress, depression and anxiety are associated with LBP disability and treatment outcome in Western studies. As a consequence, many back pain management approaches take into account these psychosocial factors and attempt to address modifiable factors such as patient's beliefs and coping skills to reduce LBP disability. Therefore, to design a feasible and acceptable physiotherapist-led PMP for Bahrain, factors associated with LBP disability in this patient population need to be determined using valid and reliable outcome measures before tailoring the programme.

Chapter 2 showed that there is a lack of valid and reliable self-report outcome measures in languages other than English and could be a reason for the limited evidence found for psychological and social predictors of LBP. There are no previous investigations carried out to assess the association between factors associated with LBP disability and LBP disability in Arabic patients in Bahrain. Additionally, there are is valid and reliable versions of questionnaires to measure LBP disability, beliefs about LBP and its consequences or for the assessment of coping strategies in Arabic. Translating and adapting a pre-existing valid and reliable pain coping strategies measure into Arabic would improve the assessment of these factors in Arabic-speaking patients and allow the standardisation of data collection to inform later aspects of this project (Costa et al., 2007a; Lee et al., 2011; Padua et al., 2002; Wiesinger et al., 1999). Although guidelines recommend the investigation of a number of psychometric properties on an item-to-item, item-to-scale and scale-level to determine validity and reliability; this study will only investigate internal validity, short-term test-retest reliability and construct validity. This is because they could be incorporated into the final stages of the translation and cross-cultural adaptation procedures, and do not require a larger sample size.

3.2 Aims

The aims of this study were to:

1. Cross-culturally adapt and translate the RMDQ, BBQ and CSQ subscales into Arabic.
2. Test the psychometric properties of the Arabic versions of the RMDQ, BBQ and CSQ subscales.

3.3 Methods

3.3.1 Study overview

The EnRMDQ, EnBBQ and EnCSQ subscales; Diverting Attention (DA), Praying and Hoping (PH), Coping Self-Statements (CSS), Catastrophizing (CAT), Reinterpreting Pain Sensations (RPS), Ignoring Pain Sensation (IPS), Increasing Behavioural Activity (IBA), and effectiveness ratings 43: Control over Pain (COP), and item 44: Ability to Decrease Pain (ADP) were cross-culturally translated, adapted and piloted by Arabic-speaking patients with LBP as recommended by Beaton et al., (2000) (Figure III-1). Then the Arabic RMDQ (ArRMDQ), Arabic BBQ (ArBBQ) and Arabic CSQ (ArCSQ) subscales (ArDA, ArPH, ArCSS, ArCAT, ArRPS, ArIPS, ArIBA, ArCOP, ArADP) underwent validation studies to determine their psychometric properties.

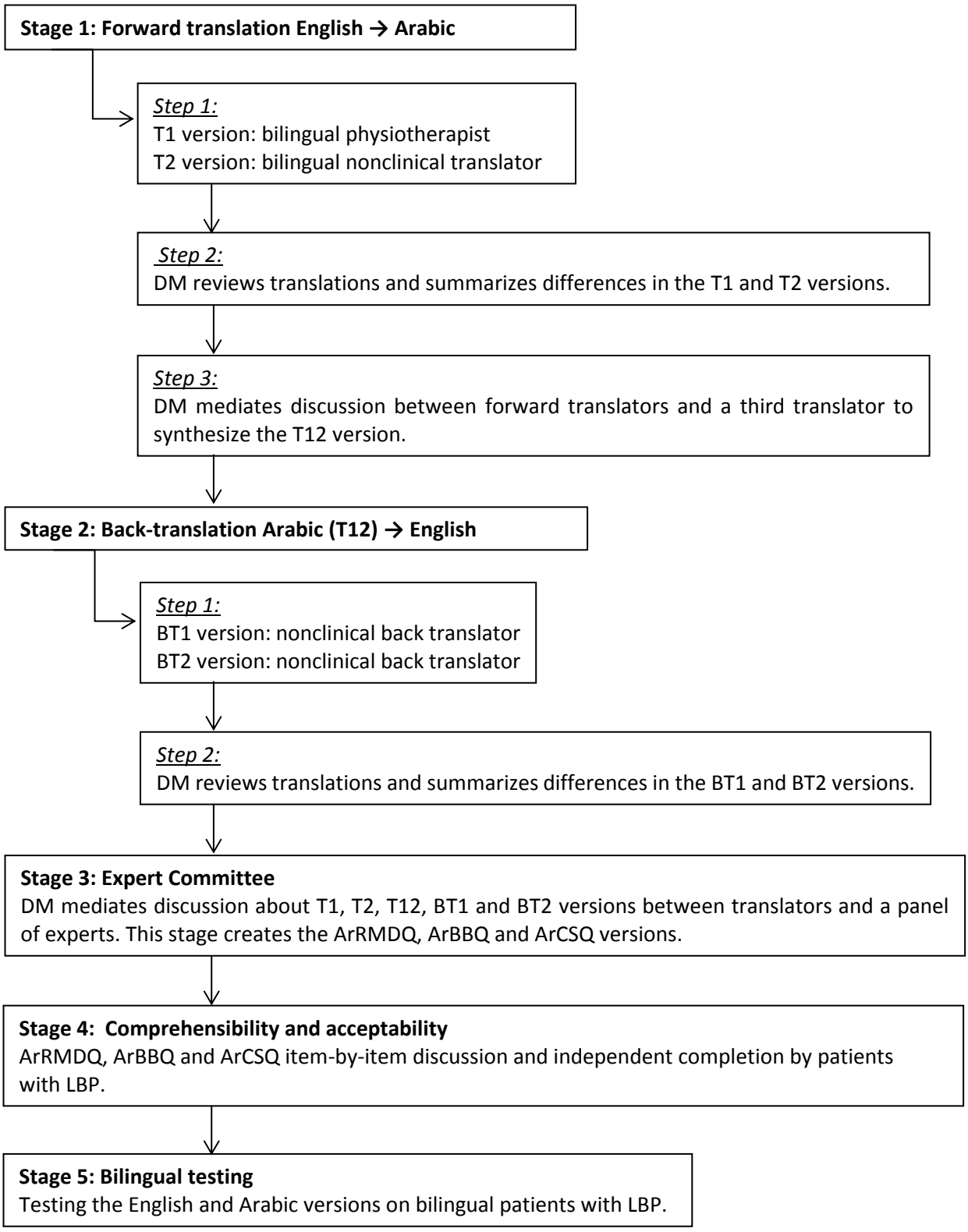

Figure III-I Cross-cultural translation and adaptation process

ArBBQ: Arabic Back Beliefs Questionnaire; ArRMDQ: Arabic Roland Morris Disability Questionnaire; ArCSQ: Arabic Coping Strategies Questionnaire; BT1: back translation 1; BT2: back translation 2; DM: Dana Maki (researcher); T1: forward translation 1; T2: forward translation 2; T12: merged T1 and T2 forward translations

3.3.2 Ethical approval

Ethical approval was obtained from the Ministry of Health, Bahrain (HM/SA/780/2013, see Appendix 6) and Biomedical Sciences, Dentistry, Medicine and Natural & Mathematical Sciences Research Ethics Subcommittee, King's College London, United Kingdom (BDM/12/13-36, see Appendix 7).

3.3.3 Translation and cross-cultural adaptation procedure

Translation

The questionnaires were forward translated from the original to the target language (Arabic) by a bilingual physiotherapist and a bilingual translator of non-clinical background to produce versions T1 and T2, respectively. Discussions between the forward translators were coordinated by the author (DM) who is bilingual in English and Arabic to produce one Arabic version (T12). In the case of disagreements between T1 and T2 translators, a third translator of a non-clinical background was consulted. The T12 version was back-translated from Arabic to English by two non-clinical translators, producing versions BT1 and BT2.

The T1, T2, T12, BT1 and BT2 versions were discussed by an expert committee of two physiotherapy clinical specialists and one senior physiotherapist in musculoskeletal physiotherapy, three academic physiotherapists and the three translators and the DM. The main purpose of the expert committee was cultural adaptation, by following the guidance from Beaton et al., (2000) outlined below:

1. The introduction to the questionnaire
2. The instructions to the questionnaire
3. Semantic equivalence
    a) Do the words mean the same thing?
    b) Are there multiple meanings to a given item?
    c) Are there grammatical difficulties in translation?
4. Idiomatic equivalence
    a) Determine whether the idioms have the same meaning with the chosen expressions in the Arabic version
5. Experiential equivalence

a) Are the given tasks, if any, experienced in the target culture (Arabic) similarly to the original?

6. Conceptual equivalence
   a) Concepts described, if any, mean the same in the target culture (Arabic) as in the source?

Recommendations from the Arabic McGill Pain Questionnaire developed by Harrison (Harrison, 1988) were used to select descriptors of pain. Arabic is scribed from the right to the left; therefore the expert committee ensured that the Likert scales of the ArBBQ and ArCSQ followed that format to maintain consistency. The ArRMDQ, ArBBQ and ArCSQ were produced following recommendations from the committee.

Participants

All participants throughout the study were recruited from four outpatient physiotherapy sites in Bahrain as part of the cross-sectional study (Chapter 4). Patients were for the translation and cross-cultural adaptation process were recruited to one aspect of the study only. The departments are outlined in Table III-1.

Table III-1 Outpatient physiotherapy departments recruited to participate in the study

Name	Type of healthcare service	Description of department and location
Salmaniya Medical Complex (SMC)	Public	Department in a teaching hospital located in the capital of Bahrain (Manama)
Isa Town Healthcare Centre (ITHC)	Public	Department in a primary healthcare centre in a suburb (Isa Town)
Taaheal Physiotherapy Complex (TPC)	Private	Outpatient physiotherapy clinic located in the capital of Bahrain (Manama)
Benan Physiotherapy Clinic (BPC)	Private	Outpatient physiotherapy clinic located in a suburb (Budaiya)

Patients had to native Arabic speakers, ≥18 years old with back pain, with or without leg symptoms lasting for more than three months. Reasons for exclusion were a diagnosis of inflammatory disease, spinal fractures or recent surgery (less than 1 year ago), or pregnancy. Participants fluent in English as a second language were allocated to the bilingual testing procedure. All participants gave written informed consent prior to data collection. Participants

were anonymized. A numerical coding system was used to identify which stage of the translation and cross-cultural adaptation process the patients participated in and hospital site. Patients' socio-demographic characteristics; age, gender, marital status, education level, work status, nature of work, and history of LBP (duration and reason for pain) were collected.

Assessing for comprehensibility and acceptability

To assess for comprehensibility, participants were recruited by to complete the questionnaire with DM. Items were read verbatim to the patients. Participants were probed for their understanding of the item to ensure that the adapted version has retained the intended meaning. Comments were used to identify poorly constructed items and inform further the development of the questionnaire (Beaton et al., 2000; Rattray and Jones, 2007). The following probes were used;

1. What does this item mean to you?
2. What reason(s) is (are) behind your response?

To assess for patient's acceptability of the questionnaires, physiotherapists identified participants from a clinical setting to complete the questionnaire. Literate participants independently completed the questionnaires, and items were read verbatim by to illiterate ones. Participants were asked to comment on their experience. The following probe was used;

- Tell us about your experience in filling out these questionnaires.

Bilingual testing

Bilingual participants completed the English and Arabic versions on the same day. Participants were given a 30 to 45-minute break between versions. The Arabic versions had items in random order to minimize a recall effect (Kovacs et al., 2002; Maneesriwongul and Dixon, 2004). Questionnaire packs with the English then Arabic version, or vice versa, were prepared. The versions were separated with a page containing the instruction to stop and take a break The questionnaires were placed in random order of the language to start with (English then Arabic version packs or vice versa) to give out to consecutive participants.

3.3.4 Psychometric testing

Participants completed the ArRMDQ, ArBBQ and, ArCSQ at baseline and seven days later to measure short-term reliability. Additionally at baseline, they completed a Visual Analogue Scale (VAS) for pain intensity (Roach et al., 1997), and validated Arabic versions of the FABQ (includes FABQ-w and FABQ-pa subscales) (Laufer et al., 2012) and HADS (includes HADS-anx

and HADS-dep subscales) (El-Rufaie and Absood, 1995; El-Rufaie and Absood, 1987). (See: Appendices 8 and 9.) Validity was examined by assessing construct validity; whether an outcome measure correlates appreciably with dimensions it is postulated to measure (Laufer et al., 2012; Mâaroufi et al., 2007; Terwee et al., 2007). The RMDQ was compared with pain intensity (VAS) to determine validity. Although a strong correlation is considered to be above 0.60, it was expected to correlate moderately to pain intensity (Bejia et al., 2005; Kovacs et al., 2002; Küçükdeveci et al., 2001; Mâaroufi et al., 2007). The BBQ assesses back pain-related beliefs and the FABQ subscales measure two of the dimensions the ArBBQ postulates to measure: (1) pain beliefs and work (FABQ-w), and (2) pain beliefs and physical activity (FABQ-pa). A low ($r \leq -0.30$) to moderate ($r = -0.30$ to -0.60) inverse correlations between FABQ, and its subscales to BBQ were expected based on a previous study showing an inverse low to moderate correlation to the physical activity and work subscales of the FABQ respectively (Chen et al., 2011). Previous studies have shown low correlations between symptoms of depression, distress and anxiety to DA, RPS, IBA, IPS, PH, COP, ADP; and low to moderate correlations (0.28 to 0.32) to CSS and moderate correlations to CAT subscales of the CSQ (Jensen et al., 1991; Keefe and Williams, 1990; Main and Waddell, 1991; Tan et al., 2001).

3.3.5 Data analyses

Initial data treatment

SPSS 19.0 (IBM UK Ltd) was used for analyses. Data were explored for normality using histograms, Kolmogorov-Smirnov and Shaprio-Wilks statistics. All BBQ scores (EnBBQ and ArBBQ) refer to the inevitability subscale of the BBQ calculated by reversing and summing 9 inevitability items (1, 2, 3, 6, 8, 10, 12, 13, and 14) and excluding distractor items (4, 5, 7, 9, 11).

Bilingual testing

The agreement of the scales in English to Arabic scales was calculated using intra-class correlation coefficient for a two-way random model and absolute agreement (ICC 2, 1). ICC scores ≥ 0.75 will be considered to have good test re-test reliability (Fleiss, 2011).

Bland-Altman plots were used to visually assess for agreement between the English and Arabic subscales (Bland and Altman, 1986). Mean differences and limits of agreement will be calculated for each plot and compared with minimally clinically important differences for each subscale (Bland and Altman, 1986).

Kappa statistics of agreement was used for item-by-item analysis. With the exception of the ArRMDQ items, all ArBBQ items (including distractors) and ArCSQ subscales were tested using

a 3x3 linear weighted Kappa statistics of agreement for all item-by-item analyses. The 3x3 linear weighted Kappa statistic was calculated to assume that there is no clinically important difference of 1 point in either direction of the scale; therefore it was weighted at 0.5 agreements (partial agreement). No agreement was weighted at 0 for a difference of ≥2 points in either direction of the scale. Kappa statistic and ICC values of ≥0.80 were considered high, 0.61–0.80 to be acceptable, 0.41–0.6 moderate agreement and 0.21–0.4 fair agreement (Fitzpatrick et al., 1998).

Construct validity

Correlation coefficients, to determine the association of the ArRMDQ to pain intensity, ArBBQ to FABQ-w and FABQ-pa, and ArCSQ subscales to the HADS, were calculated using Pearson's r and Spearman's rho (for parametric and non-parametric data respectively). Scores of each of the scales were compared against previous findings reported in the literature to determine validity (see 3.3.4).

Internal consistency

Cronbach's alpha was used to measure the internal association of questionnaires and analysis of Cronbach's alpha if-item-deleted determined the individual item's contribution towards internal consistency and item redundancy (Cronbach, 1951). In the case of the ArBBQ; Cronbach's alpha and alpha if-item-deleted was based on the contribution of the inevitability items' contribution only. For ArCSQ, the analyses were carried out on a subscale level. A high Cronbach's alpha of ≥0.70 suggests items measure the same construct (Cronbach, 1951; Terwee et al., 2007).

Test re-test reliability

Test re-test reliability of the questionnaires, were calculated using intra-class correlation coefficient for a two-way random model and absolute agreement (ICC 2, 1). ICC scores ≥ 0.75 will be considered to have good test re-test reliability (Fleiss, 2011).

Additionally Bland-Altman plots were used to visually assess for test re-test reliability of all subscales (Bland and Altman, 1986). Mean differences and limits of agreement will be calculated for each plot and compared with minimally clinically important differences for each subscale (Bland and Altman, 1986).

Kappa statistics were used to test for item-by-item analysis. With the exception of the ArRMDQ items, all ArBBQ items (including distractors) and ArCSQ subscales were tested using a 3x3 linear weighted Kappa statistics of agreement for all item-by-item analyses. The 3x3 linear weighted Kappa statistic was calculated to assume that there is no clinically important

difference of 1 point in either direction of the scale; therefore it was weighted at 0.5 agreements (partial agreement). No agreement was weighted at 0 for a difference of ≥2 points in either direction of the scale. Kappa statistic and ICC values of ≥0.80 were considered high, 0.61–0.80 to be acceptable, 0.41–0.6 moderate agreement and 0.21–0.4 fair agreement (Fitzpatrick et al., 1998).

Sample size calculation

Based on previous test re-test reliability testing of the RMDQ (Costa et al., 2007a) and BBQ (Chen et al., 2011; Symonds et al., 1996), a sample size calculation estimated 57 participants would detect an approximate value of ICC= 0.85–0.95 with 95% confidence. *F*-test p values where presented with short-term reliability testing of samples < 57 participants.

Principal component analysis

The 42 items of the CSQ were subjected to principal component analysis (PCA) with varimax rotation procedure. Components were retained if their items' primary loading was greater than 0.40 and the same items' largest secondary loading was a minimum of 0.20 less than the primary loading based on criteria from Swartzman et al., (1994). The components' correlation matrix was examined to determine the need for an oblique rotation procedure (Burton et al., 1995; Swartzman et al., 1994). Components and their respective items were compared to the original subscales of the CSQ.

3.4 Results

3.4.1 Translation and cross-cultural adaptation results

Translation

ArRMDQ

There were no major discrepancies between forward and back-translators. T1 and T2 translators used different sentence structures for some items. They were settled by consultation with a third translator. "Because of my back" translates better grammatically into "because of my back pain" in Arabic. The three translators decided to use "because of my back", as in the original version, to allow the reader to reflect on all back-related symptoms.

The expert committee found the ArRMDQ generally clear. There were discussions regarding items 6, 11 and 18. In Item 6: *Because of my back, I lie down to rest more often,* the frequency of 'often' was discussed for an appropriate Arabic equivalent. Item 11 addressed kneeling; *Because of my back, I try not to bend or kneel down.* The expert committee was careful not to

contradict advice for prayer positions, and lifting and handling advice. Item 18: *I sleep less well because of my back* was difficult to translate due to colloquialism in "less well" therefore it was decided to use Arabic equivalent of "not well".

ArBBQ

There were no major differences between forward and back-translations. T1 and T2 translators used different sentence structures for some items. T1 and T2 differed in their choice of phrase for "bad back" and "back troubles". They were settled by consultation with a third translator, where they decided to use "back trouble(s)" as in the original version to allow the reader to reflect on all back-related symptoms. Item 5: *A bad back should be exercised* was the only phrase in the T12 version that used a different phrase, "fatigued back". DM contacted the developers of the BBQ to clarify their choice of phrases and presented it with the T12 version to the expert committee. The developers suggested the use of a phrase that reflects all back troubles.

The expert committee found the ArBBQ generally clear. They reviewed the title to ensure that "belief" was correctly conjugated. (The Arabic words for "beliefs" and "religious beliefs" have the same root word but are conjugated differently). They used "back pain" instead of "back" in the title because "back" and "noon" are homographs in Arabic. The expert committee decided to use the phrase "back trouble(s)" or "troubles of the back" throughout the text, including item 5, following consultation with the original developers. Other minor grammatical changes were made to improve the sentence structure.

ArCSQ

T1 and T2 translators used different synonyms in Arabic to translate adjectives that describe pain and feelings, for example "pleasant" in item 3: *I try to think of something pleasant* and item 26: *I replay in my mind pleasant experiences from the past.* There was disagreement over 4 other words in 4 items; "dull" in item 4, "terrible" in item 5, "awful" in item 11 and the verb "bother" in item 31. The discrepancies were resolved after discussions with the third translator and the mediating author (DM).

The expert committee agreed with the decisions taken by forward translators except for their choice of "dull and warm" in item 4. They felt that "dull" did not translate well to portray the intended English meaning and that "warm" might imply a positive sensation, as warmth is associated with relaxation and pain reduction. Therefore they decided to describe a "dull or warm feeling" as "a vague feeling that is difficult to describe". In item 12: *I play mental games with myself to keep my mind off the pain*, "mental games" were changed to "occupy my thoughts". Item 23: *No matter how bad it gets, I know I can handle it*, contained the Arabic

term for “severity” for “how bad it gets” which clinicians found contained medical jargon. It was changed to a colloquial phrase that compares closely with “how bad it gets”. And finally, the expect committee rephrased items 32 and 37 (*Although it hurts, I just keep on going* and *I feel like I cannot go on)*. The expert committee felt the phrases used in version T12 mainly implied suicidal ideation. Other minor grammatical changes were made to improve the sentence structure.

Participants in the stages of translation and adaptation procedures

A total of 35 patients participated in the stages of questionnaire translation and adaptation. Table III-2 contains a summary of their characteristics and scores.

Table III-2 Participants' characteristics across the different stages of the translation and cross-cultural adaptation procedure

	Stage of the Translation and Adaptation Procedure		
	Comprehensibility	**Acceptability**	**Bilingual testing**
n =	8	10	17
Gender (M / F)	2 / 6	4 / 6	9 / 8
Age (years)	42.38 (8.28)	39.7 (14.57)	36.47 (12.74)
EnRMDQ			7.41 (5.77)
ArRMDQ		6.70 (5.03)	6.88 (5.67)
EnBBQ			25.82 (5.60)
ArBBQ		30.70 (5.81)	26.41 (4.50)
DA		16.56 (6.31)	17.19 (6.80)
RPS		13.78 (8.57)	10.12 (6.92)
CAT		14.33 (9.98)	12.94 (5.25)
IPS		15.00 (5.57)	17.37 (8.47)
PH		25.00 (4.80)	22.06 (8.81)
CSS		25.89 (7.17)	27.13 (4.95)
IBA		17.33 (7.07)	17.50 (6.25)
COP		4.00 (1.23)	4.00 (0.926)
ADP		3.67 (1.12)	3.60 (1.12)
ArDA			17.76 (8.17)
ArRPS			11.29 (8.12)
ArCAT			10.35 (6.18)
ArIPS			17.47 (7.20)
ArPH			21.71 (8.33)
ArCSS			27.82 (6.40)
ArIBA			16.24 (5.44)
ArCOP			3.94 (0.90)
ArADP			3.94 (1.20)

All data presented as Mean (SD); English subscales of the CSQ; DA: Diverting Attention, RPS: Reinterpreting Pain Sensations, CAT: Catastrophizing, IPS: Ignoring Pain Sensations, PH: Praying and Hoping, CSS: Coping Self-Statements, IBA: Increasing Behavioural Activity, COP: item 43 Control over Pain (COP), ADP: item 44 Ability to Decrease Pain; Ar: denotes Arabic subscales of the CSQ.

Comprehensibility and acceptability testing

All items on the three questionnaires were read with eight patients (2 males, 6 females) with mean (SD) age 42.38 (8.28) to assess comprehensibility. Another 10 patients (4 males, 6 females) with mean (SD) age 39.7 (14.57) completed the questionnaires in a clinical setting to assess acceptability. Two of the 10 were illiterate. Items were read verbatim to them by DM.

ArRMDQ

Patients found the ArRMDQ clear and comments did not indicate a problem in comprehension. They found the statements gave them specific tasks to consider and stimulated discussion points. For example, patients found it difficult to answer based on their activity "today" because their back pain fluctuated. They also found they do things "differently" as opposed to e.g. "slowly" in item 9: *I get dressed more slowly than usual because of my back* or break tasks down rather than avoid them e.g. item 4: *Because of my back I am not doing any of the jobs that I usually do around the house*.

None of the 10 patients completing the questionnaire in a clinical setting reported any comprehension problems. No further changes were made to the ArRMDQ after the comprehensibility and acceptability testing.

ArBBQ

Five participants found the ArBBQ clear. Three different participants expressed confusion and concern whether to agree to item 2: *Back trouble will eventually stop you from working*, item 3: *Back trouble means periods of pain for the rest of one's life*, and item 10: *Back trouble means long periods of time off work*. One of the 3 participants commenting on the ArBBQ mentioned that beliefs regarding items 1, 2, 4, 6, and 8 were dependant on patients' faith in God. Another asked to clarify "alternative treatments" in item 9.

When testing in a clinical setting, both of the illiterate participants and two others (out of 10) asked about "alternative treatments" in item 9. None reported any other comprehension problems. No further changes were made to the ArBBQ after the comprehensibility and acceptability testing.

ArCSQ

Two participants found all items on the ArCSQ subscales clear and did not comment. Two participants asked the researcher to explain "numbness" in item 10; one of whom said it was common to feel numbness in his legs with back pain. Another participant enquired about "someone" in item 14. Five participants disagreed with six items on the ArRPS (4, 16, 29, 41), two items on the ArCAT (13, 37) one item on ArIP (19) and one item on the ArIBA (2).

Two participants expressed confusion and concern whether to agree to item 18*: I try to think years ahead, what everything will be like after I've got rid of the pain* (ArPH) and another two with item 25: *I worry all the time about whether it will end* (ArCAT). Item 42: *I do something active, like household chores or projects* (ArIBA) stimulated discussions with 3 different participants. One participant implied that she breaks down household chores to stay active, another found activities were good distractions, and a third participant said he frequented mosques and houses of worship as outdoor activities to distract him from his pain. Religious beliefs were apparent from five participants when discussing 7 items. Two participants reported they prayed more instead of diverting their thoughts according to the coping skill described. One found she thought of her prayers instead "of something pleasant" (item 3, ArDA) and another participant reported he listened to prayer or only watched religious television shows instead of "watching television or listening to music" (item 40, IBA). Both agreed on reciting prayers instead of "counting numbers" or "a song through my mind" (item 9, ArDA). Four participants expressed complete agreement with 3 of the ArPH items that include prayer (items 15, 28, 36). One of the participants said he was surprised to find such questions on a coping questionnaire and another also commented on item 22: *I have faith in doctors that someday there will be a cure for my pain* (ArPH) explaining that her faith is in God, and not doctors. Six participants described their reasoning behind their choice of answer for items 43 (Control Over Pain) and 44 (Ability to Decrease Pain). Two of them found the instructions for items 43 and 44 lengthy and could not decipher the difference between them.

Nine of the 10 participants in clinic found the ArCSQ simple to complete. Only one participant felt the questions were repetitive. Regarding general usability, two participants said they would have preferred percentages to the 0-6 Likert Scale. An additional participant found it difficult to remember the scale and would have preferred a scale next to each item. The researcher met with two members of the expert committee and they decided to make the introduction and items 43 and 44 more concise. Additionally, a scale of 0-6 was provided next to each item and participants were asked to indicate their answers on the scale. No other changes made to the ArCSQ after the comprehensibility and acceptability testing.

Comparison of English and Arabic versions of the questionnaires by bilingual patients

Seventeen patients bilingual in English and Arabic completed the English and Arabic versions of the questionnaires (Table III-2). Mean (SD) EnRMDQ = 7.41 (5.77), ArRMDQ = 6.88 (5.67), EnBBQ = 25.82(5.60) and ArBBQ = 26.41(4.50). Mean (SD) of the English CSQ subscales; DA = 17.19 (6.80), RPS = 10.12 (6.92), CAT = 12.94 (5.25), IPS = 17.37 (8.47), PH = 22.06 (8.81), CSS = 27.13 (4.95), IBA = 17.50 (6.25), COP = 4.00 (0.926), and ADP = 3.60 (1.12). Mean (SD) of the

ArCSQ subscales; ArDA = 17.76 (8.17), ArRPS = 17.76 (8.17), ArCAT = 10.35 (6.18), ArIPS = 17.47 (7.20), ArPH = 21.71 (8.33), ArCSS = 27.82 (6.40), ArIBA = 16.24 (5.44), ArCOP = 3.94 (0.90), and ArADP = 3.94 (1.20).

RMDQ

Agreement of the global score was good at ICC = 0.93 (95% CI 0.81–0.97). Kappa statistics (Table III-3) showed the EnRMDQ and ArRMDQ had high item-by-item agreement for 10 items, acceptable for 6 items and the remaining 8 were of moderate to fair agreement (K = 0.30-0.55). The Bland-Altman Plot (Figure III-2) showed good reliability with a mean difference of 0.53 (+4.86, -4.33).

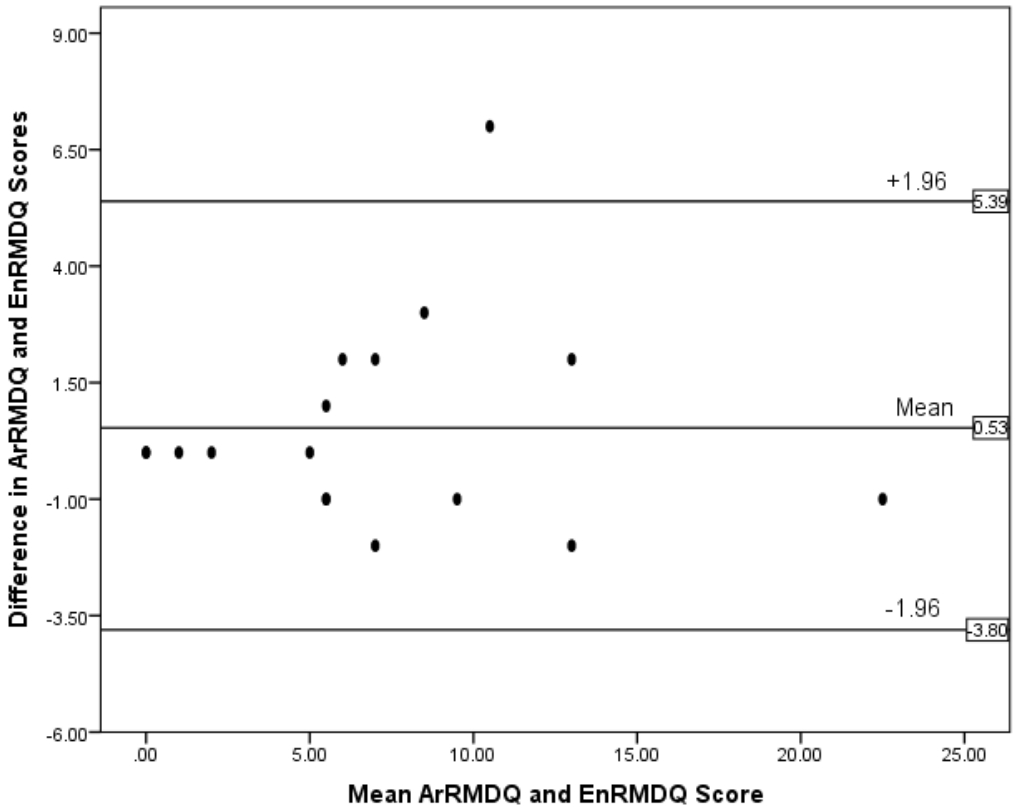

Figure III-2 Bland-Altman plot for bilingual testing of the RMDQ: mean plotted against difference.

Table III-3 Global and item-by-item Agreement of the EnRMDQ versus ArRMDQ

Agreement of RMDQ Scores	
ICC (95% CI)	0.93(0.81 – 0.97)
Item-by-item Agreement	
Item	**K =**
1	1.00
2	1.00
3	0.63
4	0.55
5	0.46
6	0.65
7	0.55
8	0.64
9	0.85
10	0.74
11	0.76
12	0.85
13	0.30
14	1.00
15	1.00
16	1.00
17	0.55
18	0.87
19	0.94
20	0.30
21	0.53
22	0.72
23	0.88
24	0.46

ArRMDQ: Arabic Roland-Morris Disability Questionnaire; CI: confidence interval; EnRMDQ: English Roland-Morris Disability Questionnaire; ICC: Intra-class correlation; K: Kappa statistic.

BBQ

Agreement of the scores was acceptable at ICC = 0.64 (95% CI 0.25–0.86). Kappa statistics (Table III-4) showed the EnBBQ and ArBBQ had fair to moderate agreement (K = 0.12–0.54) with the exception of item 10 (acceptable agreement K = 0.60) and item 2 (no agreement K = -0.08). The Bland-Altman Plot (Figure III-3) showed a mean difference of -0.59 (+9.12, -9.12).

Table III-4 Agreement of the EnBBQ and ArBBQ scores and all item-by-item analyses

Agreement of Inevitability Scores	
ICC (95% CI)	0.64 (0.25 – 0.86)
Item-by-item Agreement	
Item	**K =**
1	0.54
2	-0.08
3	0.15
4*	0.27
5*	0.43
6	0.35
7*	0.38
8	0.34
9*	0.49
10	0.60
11*	0.41
12	0.13
13	0.33
14	0.12

* distractor items not included in the generation of the score; ArBBQ: Arabic Back Beliefs Questionnaire; CI: confidence interval; EnBBQ: English Back Beliefs Questionnaire; ICC: Intra-class correlation; K: Kappa statistic.

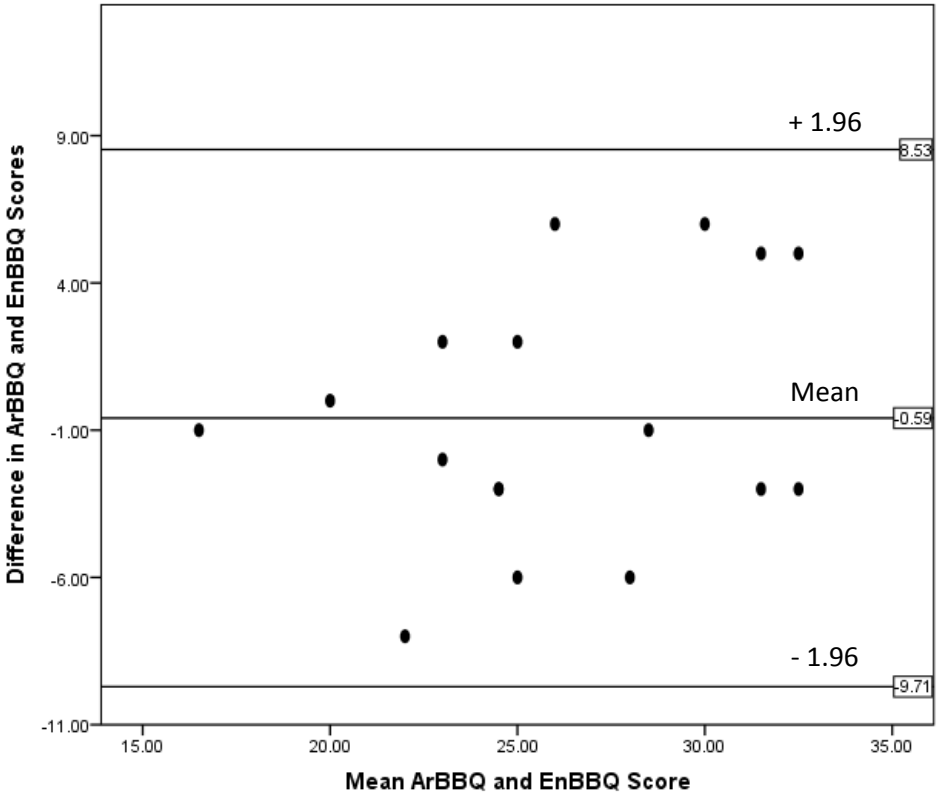

Figure III-3 Bland-Altman plot for bilingual testing of the BBQ: mean plotted against difference.

CSQ

Agreement between the subscales was high for DA, RPS, PH, CSS and IBA (ICC = 0.90 to 0.94) and acceptable for CAT and IPS (ICC = 0.70 to 0.79). See table Table III-5.

Table III-5 Agreement of the EnCSQ and ArCSQ subscales

CSQ subscales	Agreement of CSQ subscales ICC (95% CI)
Diverting Attention	0.86 (0.60-0.95)
Reinterpreting Pain Sensations	0.86 (0.61-0.95)
Catastrophizing	0.70 (0.19-0.89)
Ignoring Pain Sensations	0.79 (0.39-0.93)
Praying and Hoping	0.93 (0.80-0.98)
Coping Self-statements	0.94 (0.85-0.98)
Increasing Behavioural Activity	0.90 (0.71-0.96)

CSQ: Coping Strategies Questionnaire; CI: confidence interval; ICC: Intra-class correlation.

Kappa statistics (Table III-5) showed the 44 items between the EnCSQ and ArCSQ had 5 items showing no agreement (K ≥ 0.20), 7 items with fair agreement (K = 0.25-0.37), 10 items with moderate agreement (K = 0.48-0.60), 14 items had acceptable agreement (K = 0.62-0.76), and 5 items had high agreement K ≤ 0.80.

Table III-6 Item-by-item analyses for the ArCSQ

Item-by-item Agreement	
Item	**K =**
1	0.50
2	0.60
3	0.17
4	0.44
5	0.26
6	0.61
7	0.73
8	0.56
9	0.67
10	0.15
11	0.37
12	0.16
13	-0.08
14	0.23
15	0.53
16	0.72

Item-by-item Agreement	
Item	**K =**
17	0.26
18	0.68
19	0.36
20	0.85
21	0.01
22	0.51
23	0.64
24	0.31
25	0.46
26	0.82
27	0.69
28	1.00
29	0.73
30	0.53
31	0.61
32	0.61
33	0.90
34	0.56
35	0.58
36	1.00
37	0.59
38	0.53
39	0.48
40	0.51
41	0.76
42	0.68
43	0.72
44	0.25

K: Kappa statistic.

The Bland-Altman Plots for the CSQ subscales are shown in Figure III-4 to Figure III-12. The mean difference was close to zero for most subscales except ArDA, ArCAT, ArIBA. Limits of agreement ranged from ±4.55 to ±13.38 for subscales and ±1.96 to ±2.55 for the effectiveness ratings. Table III-7 contains a summary of mean differences and limits of agreement for all three questionnaires.

Table III-7 Mean of the difference between English and Arabic versions of the questionnaires with limits of agreement extracted from Bland-Altman Plots

	Outcome measure	English to Arabic Agreement	Figure Number
	RMDQ	0.53 (+4.86, -4.33)	Figure III-2
	BBQ	-0.59(+9.12,-9.12)	Figure III-3
CSQ subscales	**Diverting Attention**	-1.19 (-11.51, 9.14)	Figure III-4
	Reinterpreting Pain Sensations	-0.75 (-11.18, 9.68)	Figure III-5
	Catastrophizing	2.50 (13.07, -8.07)	Figure III-6
	Ignoring Pain Sensations	-0.13 (13.13, -13.38)	Figure III-7
	Praying and Hoping	0.25 (9.15, -8.65)	Figure III-8
	Coping Self-statements	-0.69 (4.55, -5.93)	Figure III-9
	Increasing Behavioural Activity	1.31 (8.24, -5.62)	Figure III-10
	Control over Pain	0.07 (2.10, -1.96)	Figure III-11
	Ability to Decrease Pain	-0.27 (2.01, -2.55)	Figure III-12

RMDQ: Roland-Morris Disability Questionnaire; BBQ: Back Beliefs Questionnaire; CSQ: Coping Strategies Questionnaire; data presented as mean (limits of agreement).

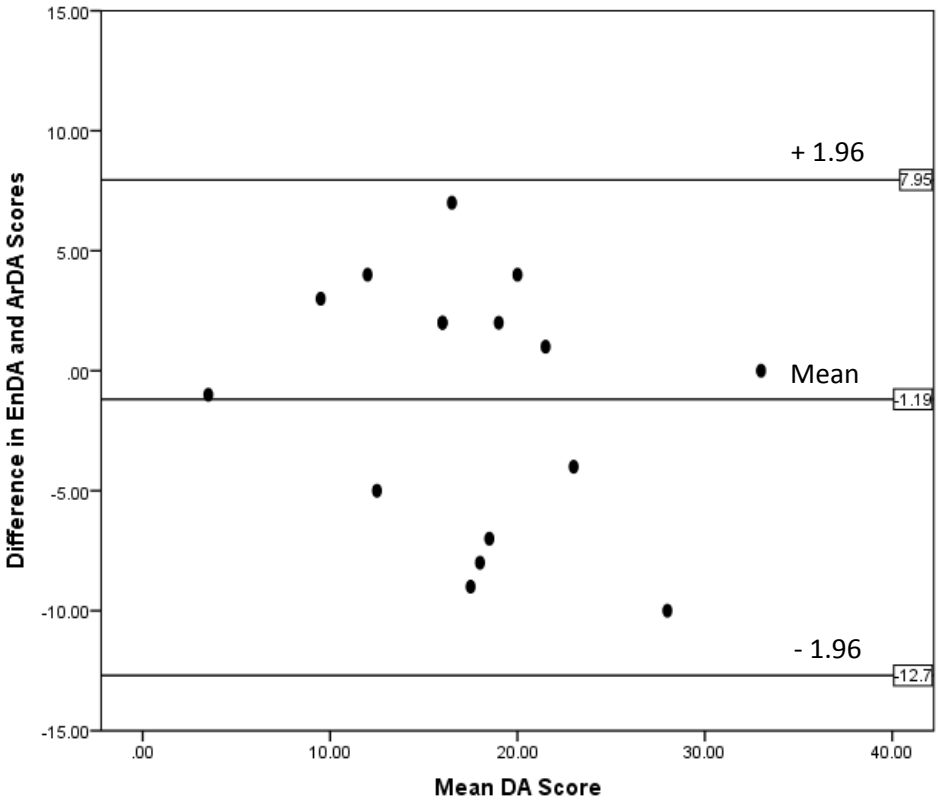

Figure III-4 Bland-Altman plot for bilingual testing of Diverting Attention (CSQ) subscale: mean plotted against difference.

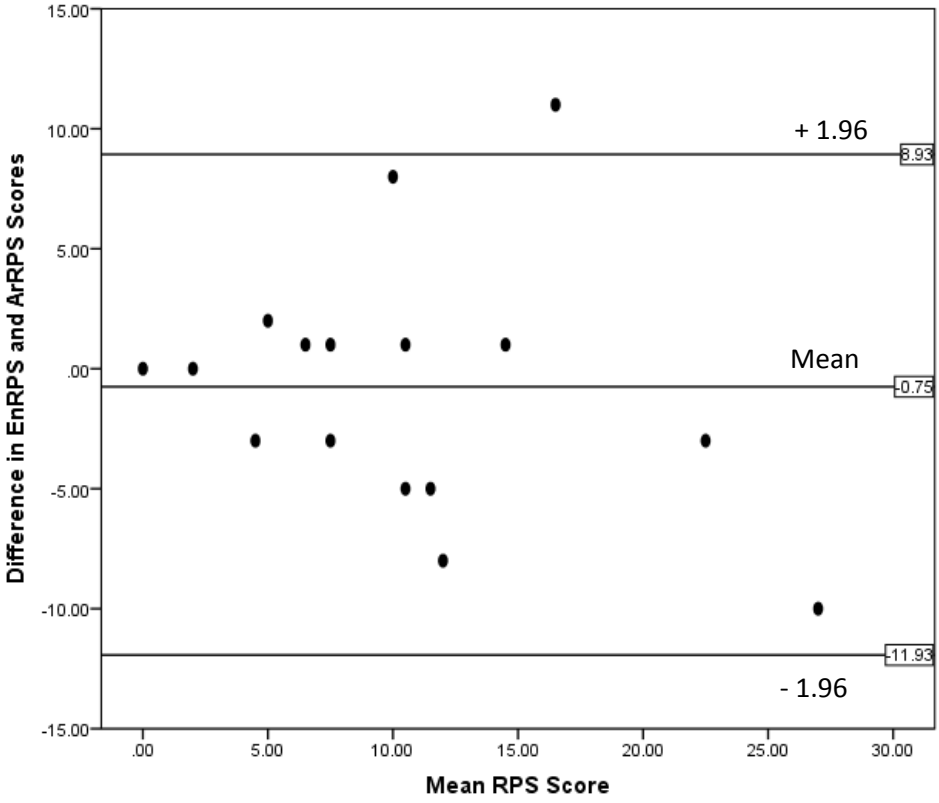

Figure III-5 Bland-Altman plot for bilingual testing of Reinterpreting Pain Sensations (CSQ) subscale: mean plotted against difference.

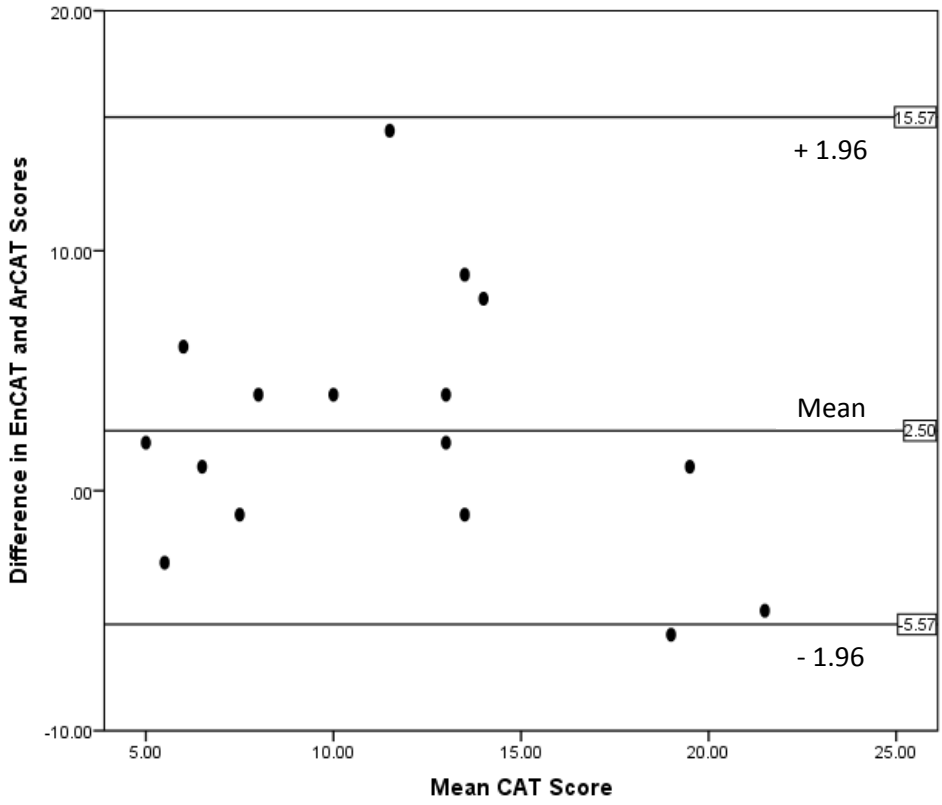

Figure III-6 Bland-Altman plot for bilingual testing of Catastrophizing (CSQ) subscale: mean plotted against difference.

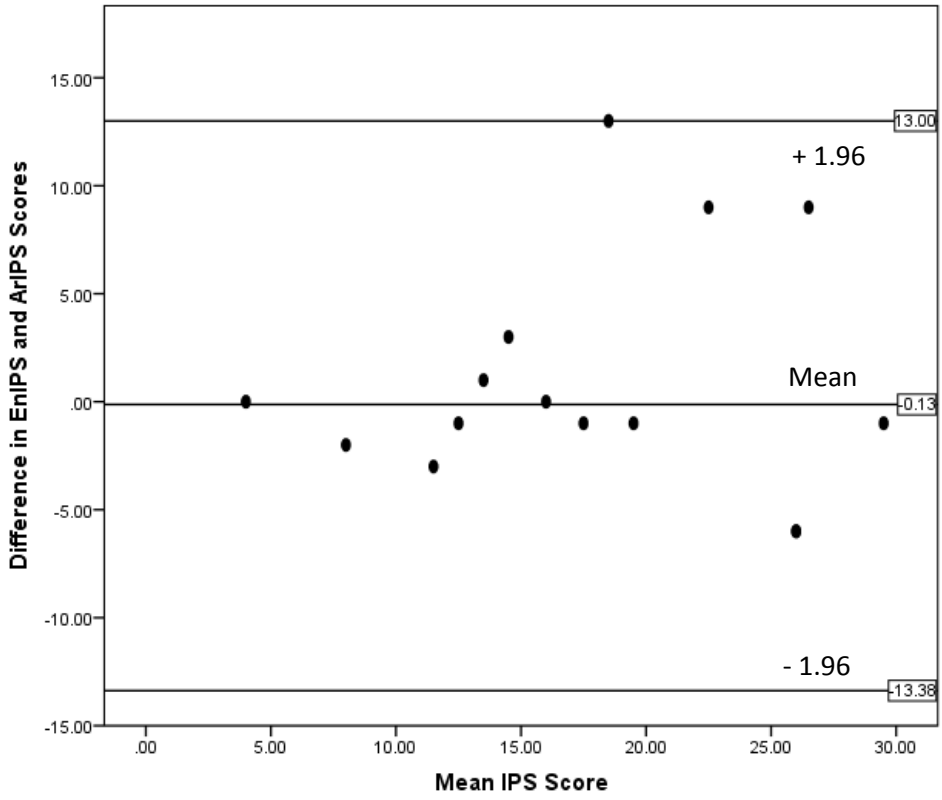

Figure III-7 Bland-Altman plot for bilingual testing of Ignoring Pain Sensations (CSQ) subscale: mean plotted against difference.

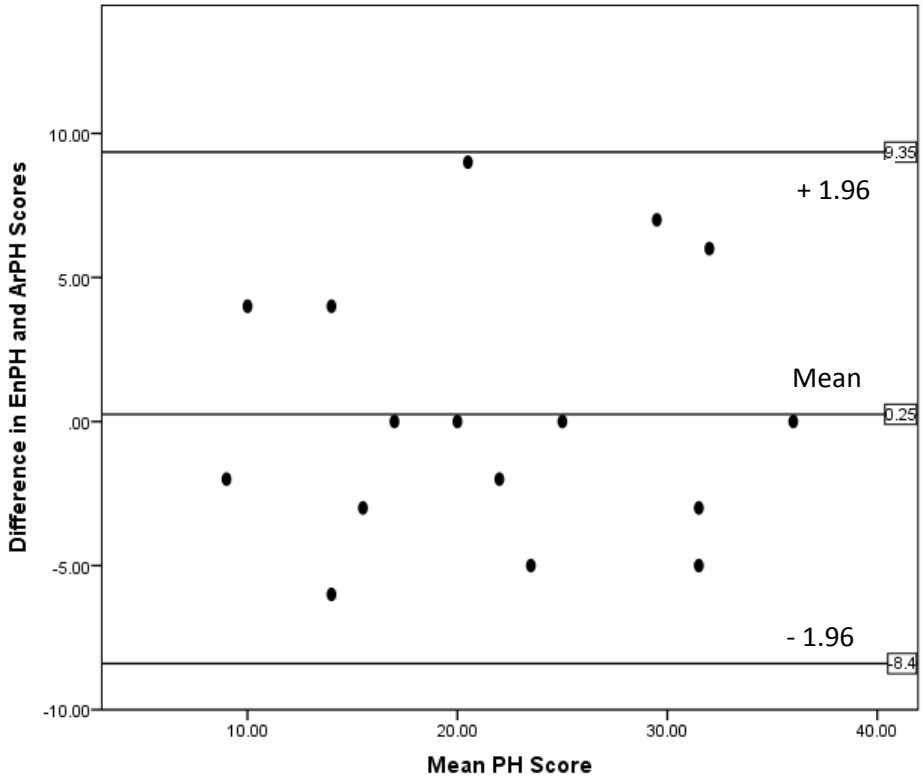

Figure III-8 Bland-Altman plot for bilingual testing of Praying & Hoping (CSQ) subscale: mean plotted against difference.

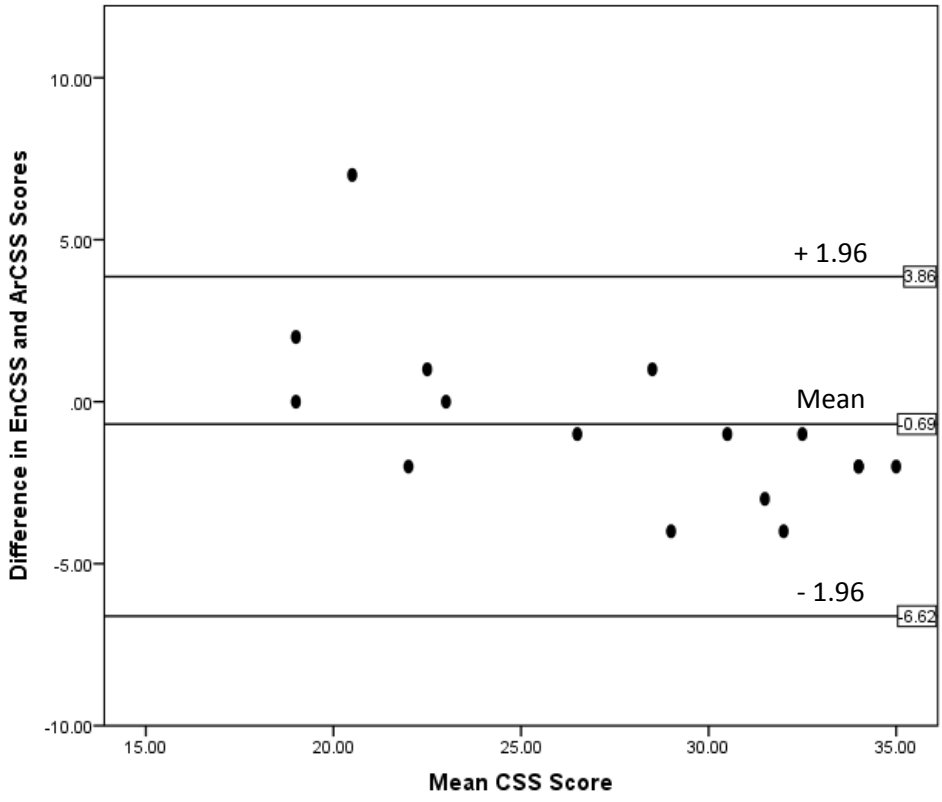

Figure III-9 Bland-Altman plot for bilingual testing of Coping Self-statements (CSQ) subscale: mean plotted against difference.

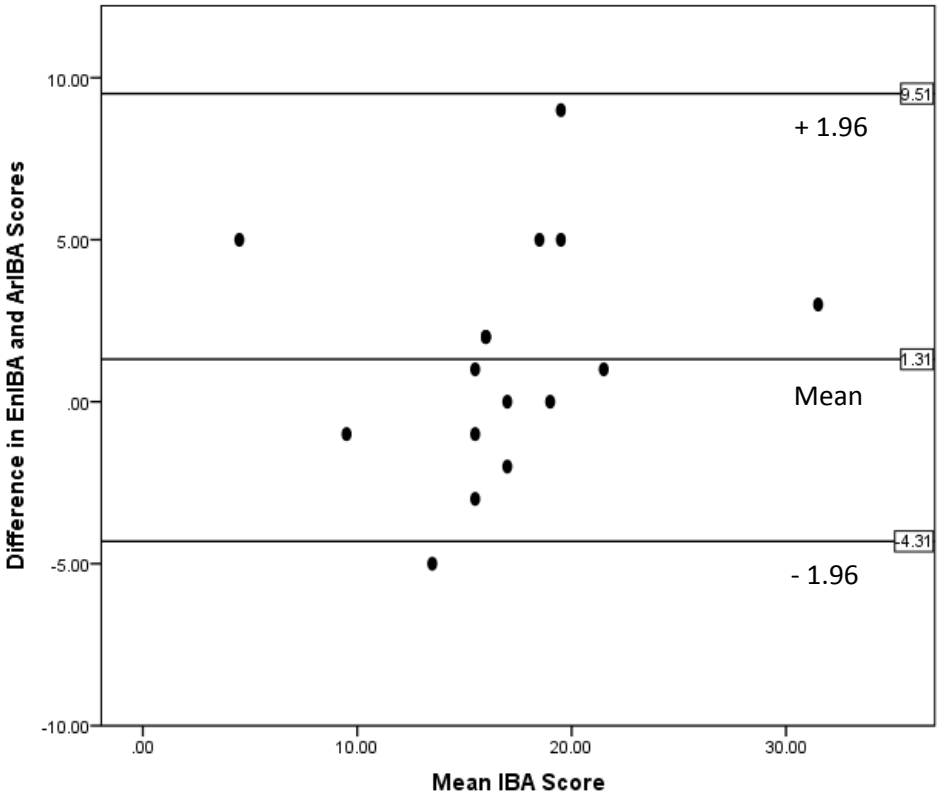

Figure III-10 Bland-Altman plot for bilingual testing of Increasing Behavioural Activity (CSQ) subscale: mean plotted against difference.

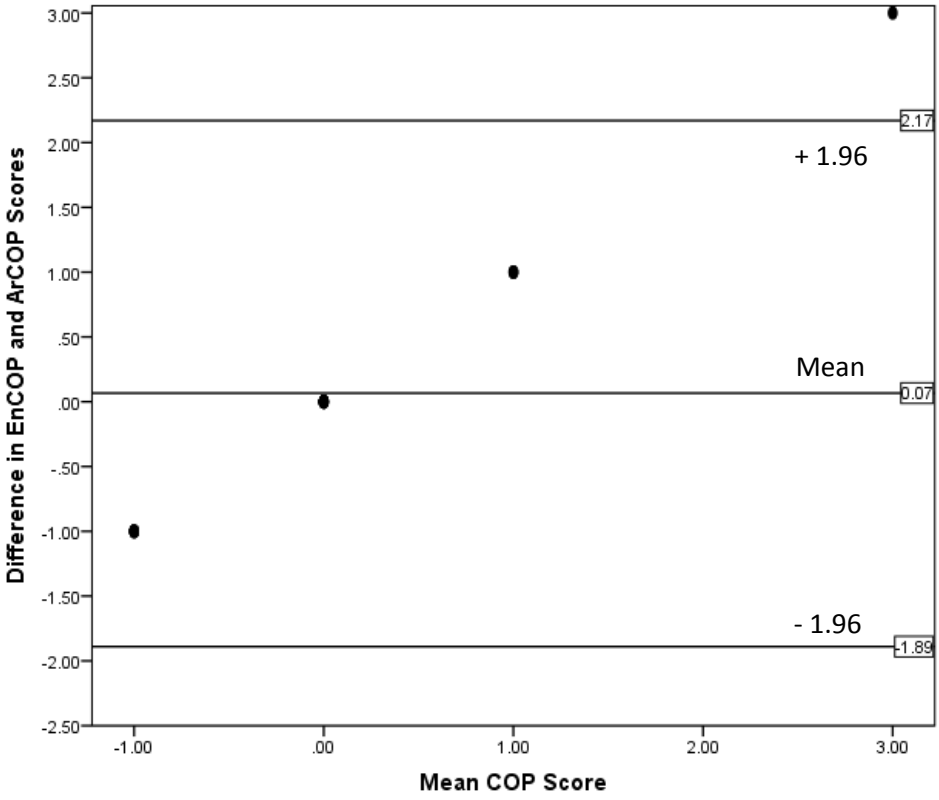

Figure III-11 Bland-Altman plot for bilingual testing of Control Over Pain (CSQ) subscale: mean plotted against difference.

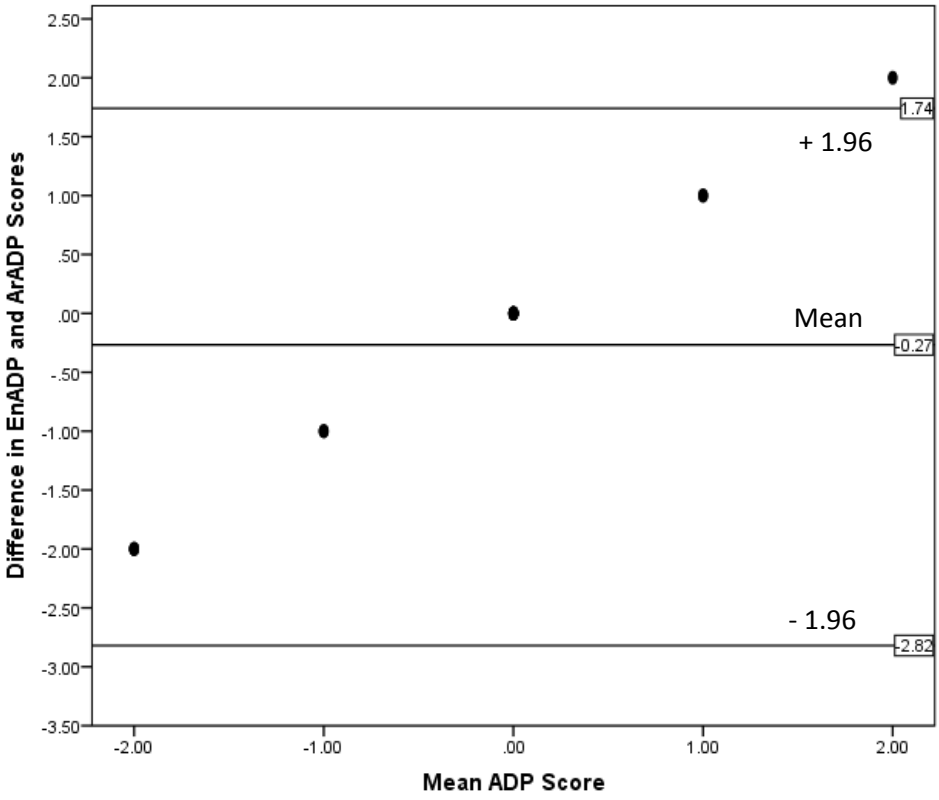

Figure III-12 Bland-Altman plot for bilingual testing of Ability to Decrease Pain (CSQ) subscale: mean plotted against difference.

3.4.2 Psychometric properties

ArRMDQ

Table III-8Table III-8 contains a summary of participants' characteristics from the different stages of psychometric testing of the ArRMDQ. Two-hundred and one participants completed the ArRMDQ and VAS. Their mean (SD) ArRMDQ = 10.53 (4.80) and VAS = 5.11 (2.28). The ArRMDQ and VAS correlated fairly ($r = 0.259$ $p < 0.01$).

Table III-8 Participants testing the psychometric properties of the ArRMDQ

	Stages of the Psychometric Testing Procedures	
	Internal consistency and construct validity	**Reliability**
n =	201	64
Gender (M / F)	69 / 132	23 / 41
Age (yr)	44.55 (14.12)	43.11 (14.99)
ArRMDQ	10.53 (4.80)	10.61(5.08)
ArRMDQ re-test		9.47 (4.52)

ArRMDQ: Arabic Roland-Morris Disability Questionnaire (0 – 24 points); EnRMDQ: English Roland-Morris Disability Questionnaire (0 – 24 points); F: Female; M: Male; n: numbers of participants; yr: years.

The ArRMDQ had high internal consistency ($\alpha = 0.73$). Internal consistency score if-item-deleted (Table III-9) showed that the removal of items 2 or 19 could increase the score to 0.74.

Table III-9 Internal consistency analyses of the ArRMDQ

Internal consistency of the ArRMDQ	
Cronbach's alpha (α)	α = 0.73
Cronbach's alpha (α) if-item-deleted	
Item	**α =**
1	0.72
2	0.74
3	0.71
4	0.72
5	0.73
6	0.73
7	0.73
8	0.71
9	0.71
10	0.72
11	0.72
12	0.72
13	0.72
14	0.72
15	0.72
16	0.72
17	0.71
18	0.73
19	0.74
20	0.71
21	0.73
22	0.72
23	0.71
24	0.72

ArRMDQ: Arabic Roland-Morris Disability Questionnaire; α = Cronbach's alpha.

Sixty-four patients were followed –up 7 days later to assess the short-term reliability of the ArRMDQ (Table III-8). Test re-test reliability showed a high ICC = 0.90 (95% CI = 0.75-0.95). Kappa statistics (Table III-10) showed two items of the ArRMDQ had high agreement (≥0.80), 15 had acceptable agreement (K = 0.61-0.79), and 7 had moderate agreement (K= 0.41-0.59).

Table III-10 Global and Item-by-item test re-test agreement of the ArRMDQ

Test re-test reliability of the ArRMDQ	
ICC (95% CI)	0.90 (95% CI 0.75-0.95)
Item-by-item test re-test reliability	
Item	**K =**
1	0.75
2	0.62
3	0.72
4	0.59
5	0.68
6	0.66
7	0.87
8	0.71
9	0.61
10	0.65
11	0.63
12	0.73
13	0.68
14	0.67
15	0.70
16	0.80
17	0.55
18	0.55
19	0.58
20	0.66
21	0.56
22	0.56
23	0.41
24	0.73

ArRMDQ: Arabic Roland-Morris Disability Questionnaire; CI: confidence interval; EnRMDQ: English Roland-Morris Disability Questionnaire; ICC: Intra-class correlation; K: Kappa statistic.

The Bland-Altman plot showed good agreement (Figure III-13). The mean difference was 1.1406 (+4.817, -3.676).

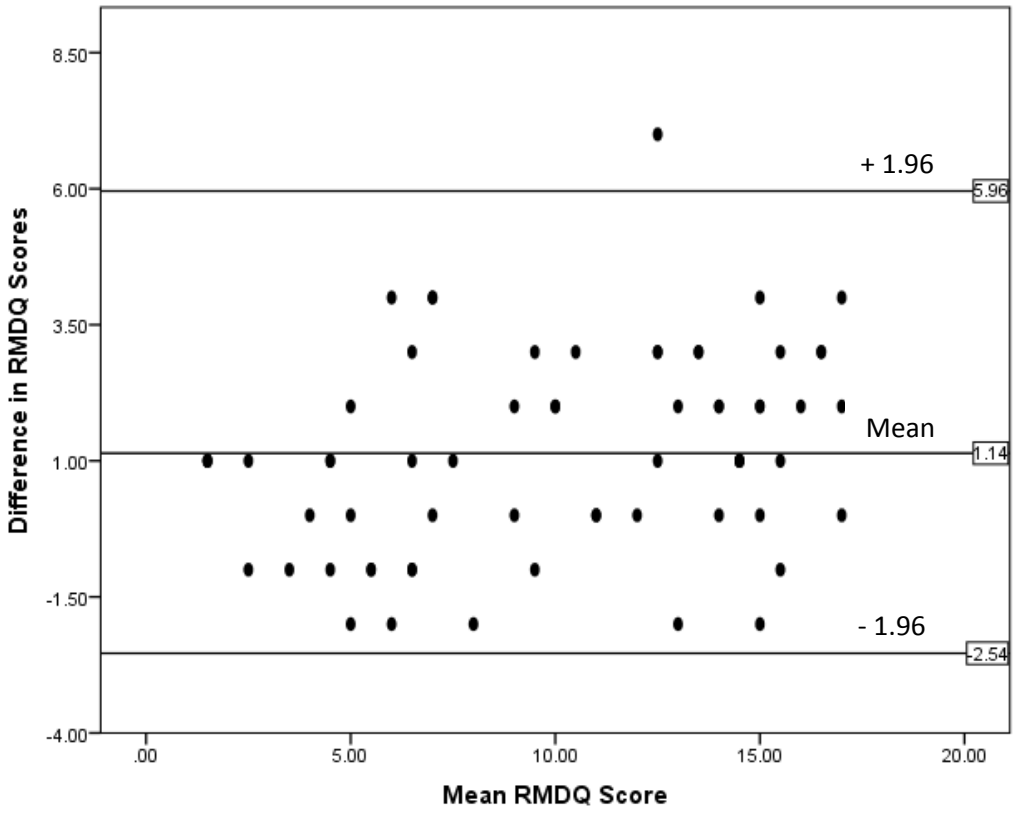

Figure III-13 Bland Altman plot for test-retest reliability of the ArRMDQ: mean plotted against difference.

ArBBQ

Table III-11 contains a summary of participants' characteristics from the different stages of psychometric testing of the ArBBQ.The ArBBQ and FABQ were completed by 151 participants. Their mean (SD) ArBBQ = 25.31 (6.13), FABQ = 44.76 (19.49), FABQ-w = 21.17 (10.10), and FABQ-pa = 13.95 (6.65). The ArBBQ correlated with the FABQ at r= -0.33 (p< 0.01), FABQ-w r= -0.29 and FABQ-pa r = -0.30 (p< 0.01).

Table III-11 Participants testing the psychometric properties of the ArBBQ

	Stages of the Psychometric Testing Procedures		
	Construct validity	**Internal consistency**	**Test re-test reliability**
n =	151	199	64
Gender (M / F)	54 / 97	69 / 130	23 / 41
Age (yr)	44.57 (13.83)	44.54 (14.18)	43.11(14.99
ArBBQ	25.31 (6.13)	27.13 (6.84)	30.88 (6.18)
ArBBQ Re-test			31.91 (6.30)

ArBBQ: Arabic Back Beliefs Questionnaire (9 – 45 points); EnBBQ: English Back Beliefs Questionnaire (9 – 45 points); F: Female; M: Male; n: numbers of participants; yr: years.

Table III-12 Internal consistency analyses of the ArBBQ

Internal consistency of the ArBBQ	
Cronbach's alpha (α)	α= 0.73
Cronbach's alpha (α) if-item-deleted	
Item	**α =**
1	0.74
2	0.68
3	0.69
4	*
5	*
6	0.69
7	*
8	0.70
9	*
10	0.69
11	*
12	0.71
13	0.77
14	0.70

* distractor items not included in the generation of the score; ArBBQ: Arabic Back Beliefs Questionnaire; α: Cronbach's alpha.

The ArBBQ had high internal consistency (α= 0.73) from 199 participants completing the ArBBQ. Internal consistency score if-item-deleted (Table III-12) showed that the deletion of items 1 and 13 would increase the score to 0.74 and 0.77 respectively.

Short-term reliability was high ICC= 0.80 (95% CI 0.68–0.87), from 64 participants tested at baseline and followed-up 7 days later. Kappa statistics (Table III-13) showed two items (1 and 12) had acceptable agreement (K=0.62, 0.66), ten items (2-9, 13, 14) had moderate agreement (K= 0.40–0.58) and two items (10 and 11) had fair agreement (0.31).

Table III-13 Global and item-by-item test re-test agreement of the ArBBQ

Test re-test reliability of the ArBBQ	
ICC (95% CI)	0.80 (95% CI 0.68–0.87)
Item-by-item test re-test reliability	
Item	**K =**
1	0.62
2	0.49
3	0.46
4	0.48
5	0.46
6	0.53
7	0.58
8	0.46
9	0.53
10	0.31
11	0.31
12	0.66
13	0.40
14	0.48

ArBBQ: Arabic Back Beliefs Questionnaire; CI: confidence interval; ICC: Intra-class correlation; K: Kappa statistic.

The Bland-Altman plot Figure III-14 showed the mean difference at -1.03 (+12.63,-8.00).

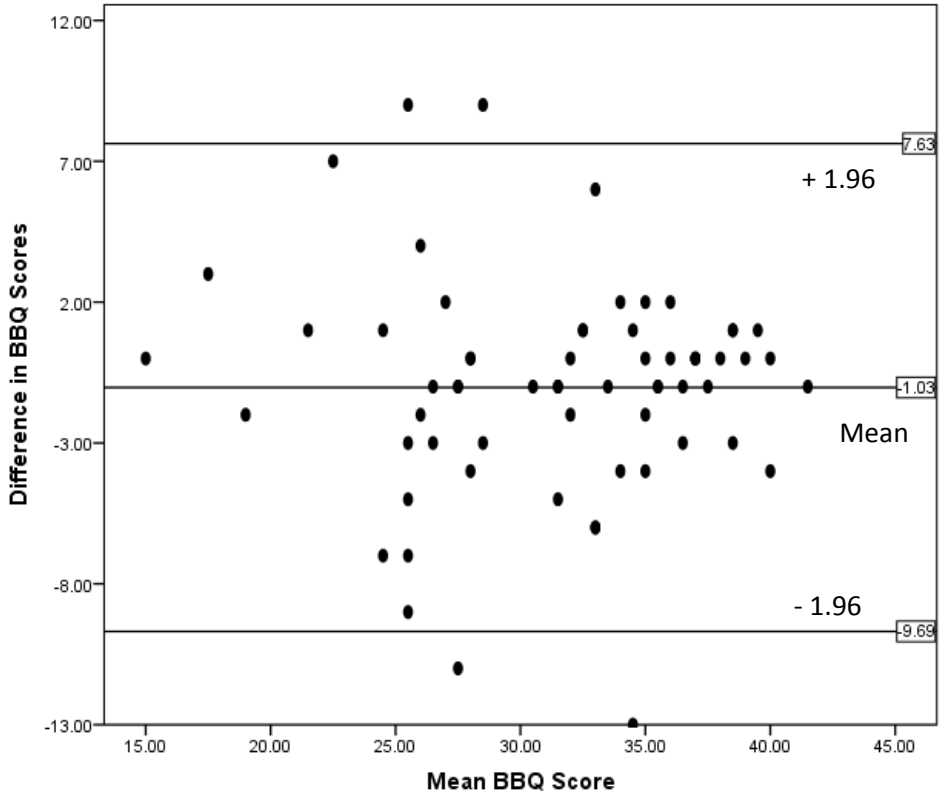

Figure III-14 Bland Altman plot for test-retest reliability of the ArBBQ: mean plotted against difference.

ArCSQ

A total of 192 participants completed the ArCSQ (Table III-14). There was missing data from 51 participants. Psychometric calculations were carried out using listwise deletion based on all variables in the procedure.

One hundred and eighteen participants completed the ArCSQ and HADS to test for construct validity. Their mean (SD) scores for HADS-dep = 5.77 (3.63) and HADS-anx = 6.71 (4.04). ArCAT had a low correlation against HADS-dep ($r = 0.29$ $p < 0.01$) and moderate against HADS-anx (0.53 $p < 0.01$). ArIPS had a moderate correlation against both HADS-dep ($r = -0.37$, $p < 0.01$) and HADS-anx (0.30 $p < 0.01$). ArPH and ArCSS only had low correlations against HADS-dep ($r = -0.19$ and -0.25, respectively, both $p < 0.01$). ArIBA correlated moderately with HADS-dep ($r = -0.35$, $p = 0.01$). ArCOP and ArADP had moderate correlations to HADS-dep ($r = -0.43$ $p < 0.01$, for both) and HADS-anx ($r = -0.35$ and -0.38 $p < 0.01$, respectively). Table III-15 contains a summary of the ArCSQ versus HADS subscales.

Table III-14 Participants testing the psychometric properties of the ArCSQ

	Stages of the Psychometric Testing Procedures		
	Construct validity	**Internal consistency**	**Test re-test reliability**
n =	118	192	35
Gender (M / F)	37 / 81	81 / 111	21 / 14
Age (yr)	45.14 (13.90)	45.59 (14.02)	48.43 (16.84)
ArDA	16.77 (8.39)	17.01 (8.36)	16.40 (8.46)
ArRPS	10.76 (7.82)	11.16 (8.23)	10.34 (8.90)
ArCAT	11.18 (7.34)	11.56 (7.33)	10.83 (6.58)
ArIPS	17.01 (8.66)	17.15 (8.83)	18.91 (8.99)
ArPH	25.80 (6.68)	25.68 (7.64)	26.34 (7.65)
ArCSS	22.06 (8.01)	22.40 (8.69)	22.80 (7.96)
ArIBA	18.52 (8.28)	19.23 (8.33)	19.51 (7.85)
ArCOP	3.91 (3.04)	3.82 (2.57)	3.80 (1.16)
ArADP	3.68 (1.26)	3.57 (1.28)	3.49 (1.12)
ArDA Retest			15.69 (7.23)
ArRPS Retest			8.17 (7.04)
ArCAT Retest			11.74 (5.76)
ArIPS Retest			17.69 (7.68)
ArPH Retest			25.97 (6.77)
ArCSS Retest			21.57 (7.10)
ArIBA Retest			20.09 (7.37)
ArCOP Retest			3.83 (1.01)
ArADP Retest			3.54 (0.85)

All data presented as Mean (SD); English subscales of the CSQ (The Coping Strategies Questionnaire); DA: Diverting Attention, RPS: Reinterpreting Pain Sensations, CAT: Catastrophizing, IPS: Ignoring Pain Sensations, PH: Praying and Hoping, CSS: Coping Self-Statements, IBA: Increasing Behavioural Activity (0 – 36); COP: item 43 Control over Pain (COP), ADP: item 44 Ability to Decrease Pain (0 – 6); Ar: denotes Arabic subscales of the CSQ; F: Female; M: Male; n: numbers of participants; yr: years.

Table III-15 Arabic CSQ subscales and HADS subscales correlations

	Hospital Anxiety and Depression Scale	
ArCSQ subscales	**Depression**	**Anxiety**
Diverting Attention	-0.10	0.04
Reinterpreting Pain Sensations *	-0.07	0.05
Catastrophizing *	0.29**	0.53**
Ignoring Pain Sensations	-0.37**	-0.30**
Praying and Hoping *	-0.19**	-0.16
Coping Self-statements *	-0.25**	-0.12
Increasing Behavioural Activity	-0.35**	-0.13
Control over Pain *	-0.43**	-0.35**
Ability to Decrease Pain *	-0.43**	-0.38**

*non parametric correlations Spearman's Rho, all other correlations are calculated using Pearson's Correlation Coefficient; ArCSQ: Arabic Coping Strategies Questionnaire.

Analysis of internal consistency from 192 participants showed that the ArCSQ subscales have high internal consistency ranging from α = 0.73 to 0.82 (Table III-16).

Table III-16 Internal consistency analyses of the ArCSQ subscales

ArCSQ subscales	**Internal consistency α=**	**Cronbach's alpha if-item-deleted α=**						
Diverting Attention	0.76	**Item**	3	9	12	26	27	38
			0.73	0.75	0.77	0.7	0.69	0.7
Reinterpreting Pain Sensations	0.77	**Item**	1	4	10	16	29	41
			0.75	0.74	0.76	0.73	0.73	0.69
Catastrophising	0.74	**Item**	5	11	13	25	33	37
			0.71	0.69	0.76	0.68	0.68	0.72
Ignoring Pain Sensations	0.82	**Item**	17	19	21	24	30	35
			0.79	0.82	0.78	0.78	0.82	0.78
Praying and Hoping	0.64	**Item**	14	15	18	22	28	36
			0.64	0.6	0.66	0.57	0.55	0.59
Control over Pain	0.81	**Item**	6	8	20	23	31	32
			0.78	0.78	0.79	0.79	0.77	0.78
Increasing Behavioural Activity	0.73	**Item**	2	7	34	39	40	42
			0.68	0.74	0.71	0.65	0.69	0.67

ArCSQ: Arabic Pain Coping Strategies Questionnaire; α: Cronbach's alpha.

Thirty-five patients were completed the ArCSQ twice seven days apart to assess short-term reliability. All CSQ subscales had high test re-test reliability ICC = 0.85 to 0.97 (Table III-17). ANOVA tables showed *F*-test p < 0.05 for ArRPS, ArCAT and ArCSS.

Table III-17 Test re-test agreement of the ArCSQ subscales

CSQ subscales	Test re-test reliability ICC (95% CI)	*F* test
Diverting Attention	0.88 (0.76-0.94)	NS
Reinterpreting Pain Sensations	0.85 (0.70-0.92)	P = 0.03
Catastrophizing	0.95 (0.90-0.98)	P = 0.04
Ignoring Pain Sensations	0.92 (0.82-0.97)	NS
Praying and Hoping	0.97 (0.94-0.99)	NS
Coping Self-statements	0.94 (0.88-0.97)	P = 0.04
Increasing Behavioural Activity	0.96 (0.93-0.98)	NS

CSQ: Coping Strategies Questionnaire; CI: confidence interval; ICC: Intra-class correlation.

Kappa statistics (Table III-18) showed 9 items had moderate agreement (K= 0.40-0.58), 21 items had acceptable agreement (K= 0.64-0.79) and 14 had high agreement (K≤ 0.80).

Table III-18 Item-by-item test re-test agreement of the ArCSQ

Item-by-item test re-test reliability	
Item	**K =**
1	0.58
2	0.74
3	0.79
4	0.65
5	0.71
6	0.81
7	0.81
8	0.64
9	0.55
10	0.73
11	0.79
12	0.86

Item-by-item test re-test reliability	
Item	**K =**
13	0.91
14	0.85
15	1.00
16	0.52
17	0.68
18	0.77
19	0.69
20	0.58
21	0.76
22	0.86
23	0.72
24	0.77
25	0.85
26	0.82
27	0.68
28	0.73
29	0.74
30	0.66
31	0.81
32	0.55
33	0.81
34	0.58
35	0.75
36	0.78
37	0.86
38	0.55
39	0.73
40	0.85
41	0.73
42	0.81
43	0.43
44	0.40

ArCSQ: Arabic Coping Strategies Questionnaire; K: Kappa statistic.

The Bland-Altman Plots Figure III-15 to Figure III-23 for the ArCSQ subscales showed a mean difference close to zero for most subscales except ArRPS, ArIPS and ArCSS. Limits of agreement ranged from ±4.04 to 12.92 for subscales and ±2.17 to 2.33 for the effectiveness ratings (Table III-19).

Table III-19 Mean of the difference between baseline and re-test of ArRMDQ, ArBBQ and ArCSQ subscales with limits of agreement extracted from Bland-Altman Plots

	Outcome measure	Test-retest reliability	Figure Number
	ArRMDQ	1.14 (+4.82, -3.68)	Figure III-13
	ArBBQ	-1.03(+6.60,-8.66)	Figure III-14
ArCSQ subscales	**Diverting Attention**	0.71 (10.95, -10.24)	Figure III-15
	Reinterpreting Pain Sensations	2.17 (12.92, -8.58)	Figure III-16
	Catastrophizing	-0.91 (4.04, -5.86)	Figure III-17
	Ignoring Pain Sensations	1.23 (8.05, -6.82)	Figure III-18
	Praying and Hoping	0.37 (5.22, -4.48)	Figure III-19
	Coping Self-statements	1.23 (7.82, -5.36)	Figure III-20
	Increasing Behavioural Activity	-0.57 (5.04, -6.18)	Figure III-21
	Control over Pain	-0.03 (2.27, -2.33)	Figure III-22
	Ability to Decrease Pain	-0.06 (2.17, -2.28)	Figure III-23

ArRMDQ: Roland-Morris Disability Questionnaire; ArBBQ: Back Beliefs Questionnaire; ArCSQ: Coping Strategies Questionnaire; data presented as mean (limits of agreement).

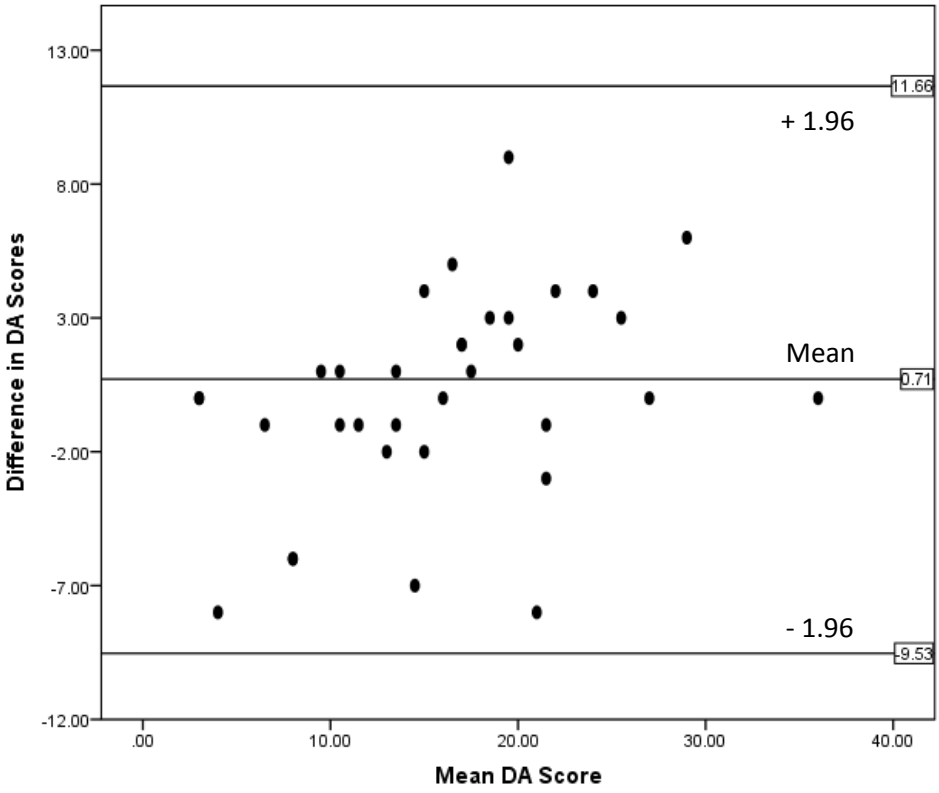

Figure III-15 Bland Altman plot for test-retest reliability of the DA subscale: mean plotted against difference.

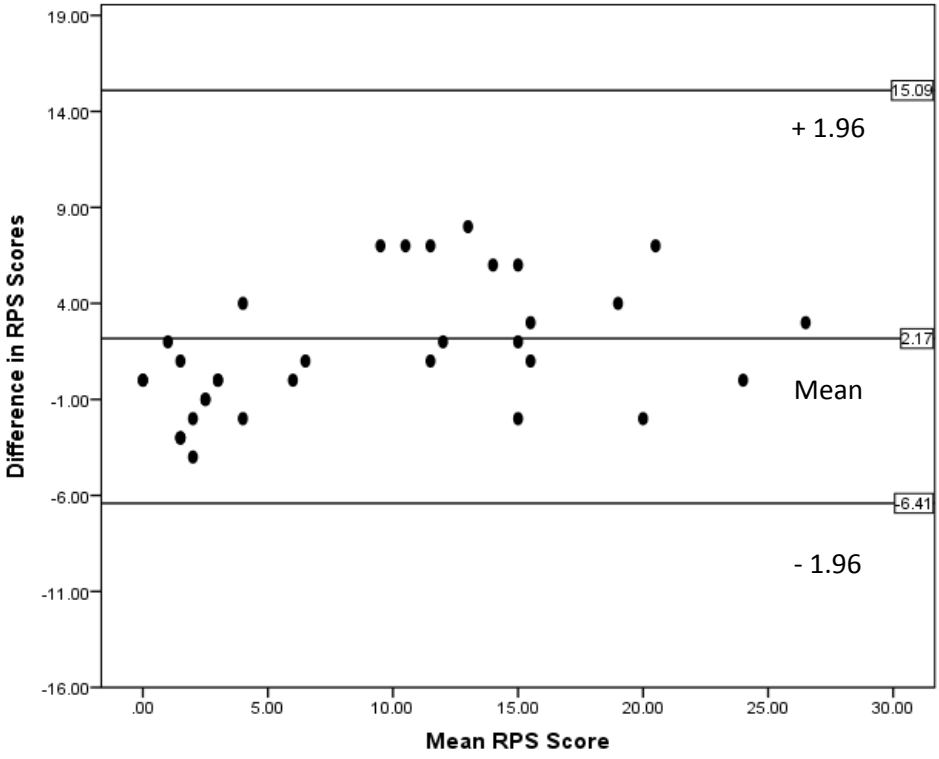

Figure III-16 Bland Altman plot for test-retest reliability of the RPS subscale: mean plotted against difference.

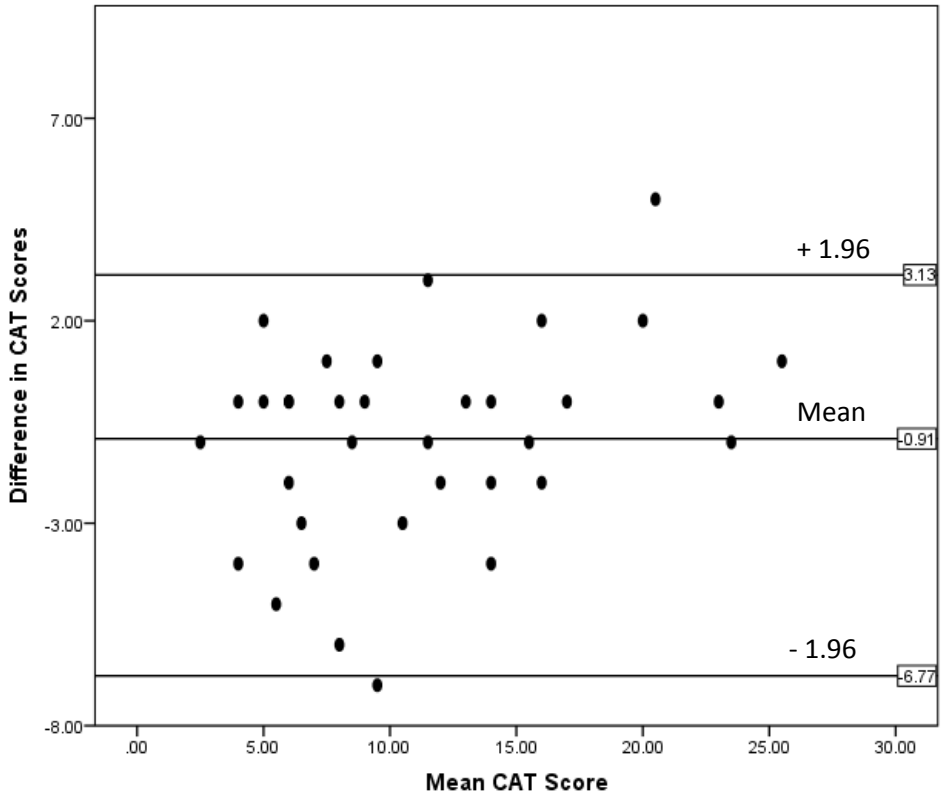

Figure III-17 Bland Altman plot for test-retest reliability of the CAT subscale: mean plotted against difference.

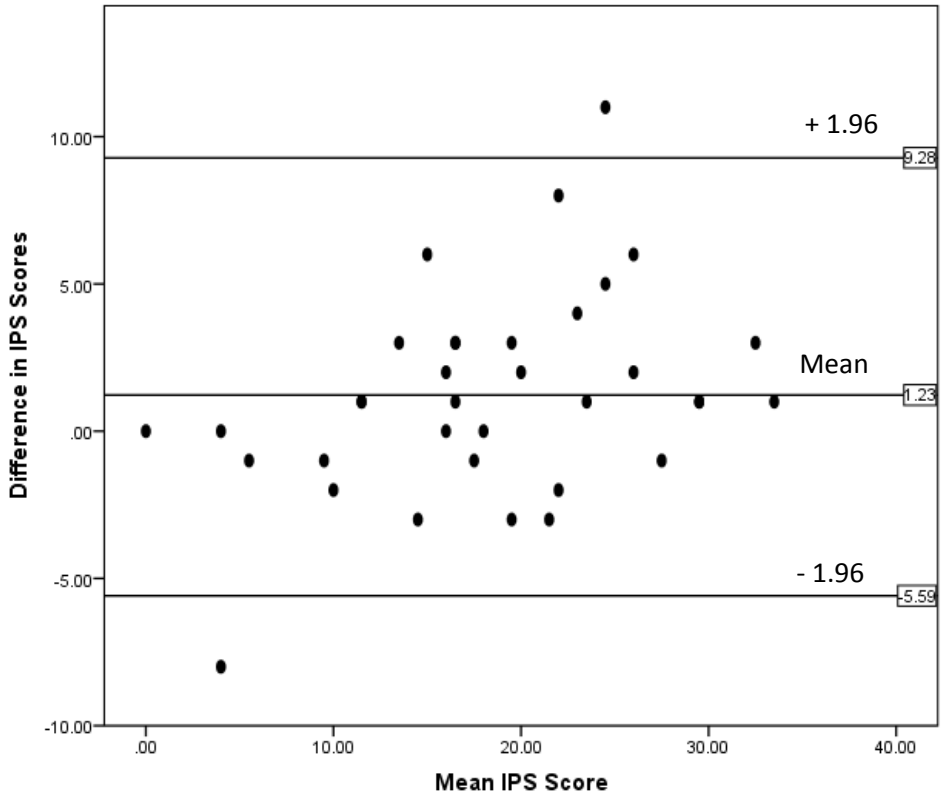

Figure III-18 Bland Altman plot for test-retest reliability of the IPS subscale: mean plotted against difference.

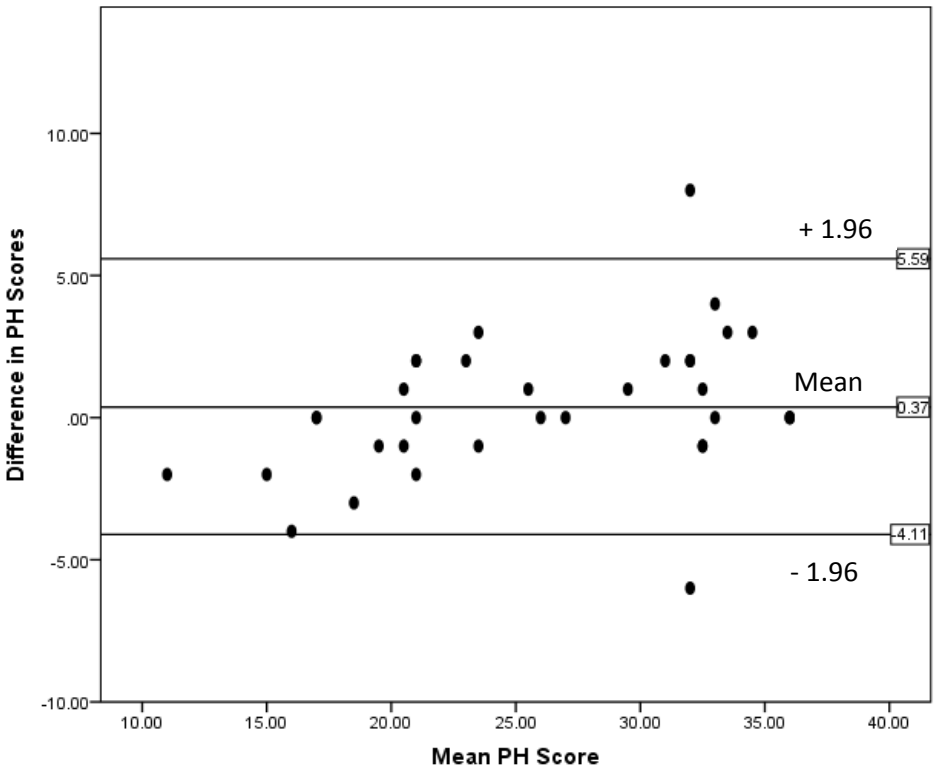

Figure III-19 Bland Altman plot for test-retest reliability of the PH subscale: mean plotted against difference.

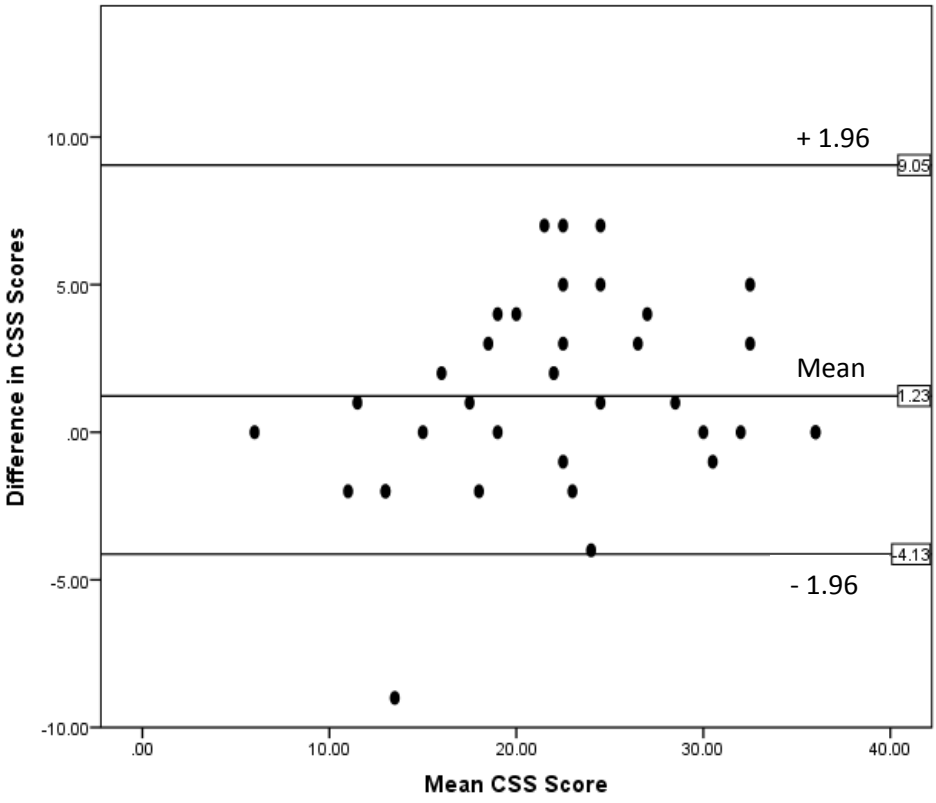

Figure III-20 Bland Altman plot for test-retest reliability of the CSS subscale: mean plotted against difference.

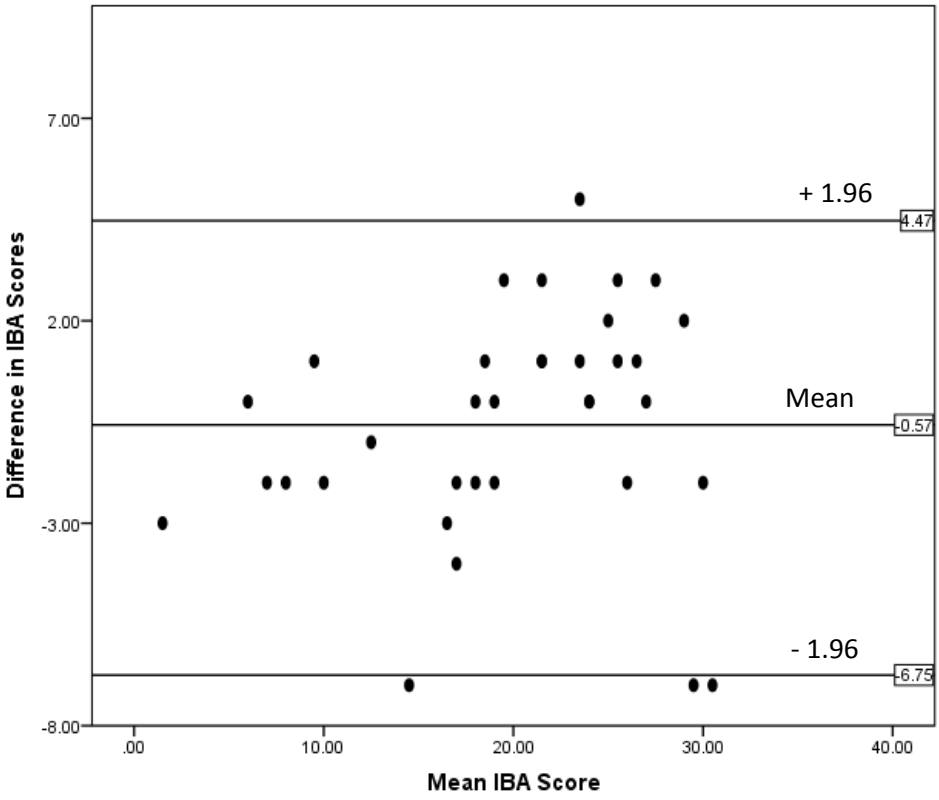

Figure III-21 Bland Altman plot for test-retest reliability of the IBA subscale: mean plotted against difference.

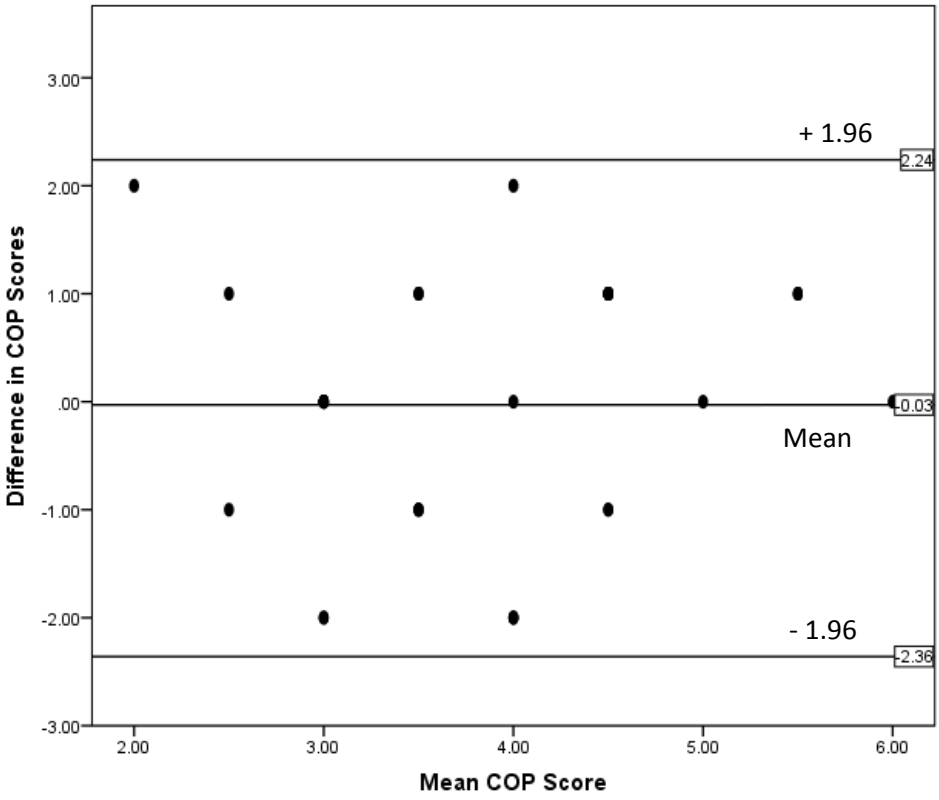

Figure III-22 Bland Altman plot for test-retest reliability of the COP subscale: mean plotted against difference.

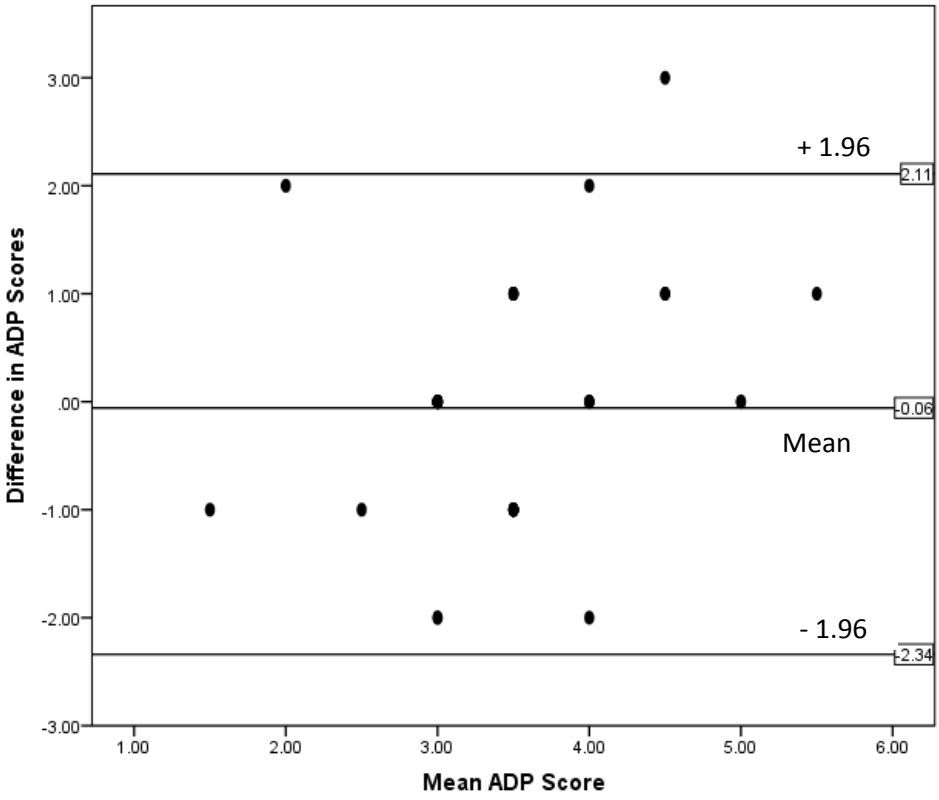

Figure III-23 Bland Altman plot for test-retest reliability of the ADP subscale: mean plotted against difference.

Principal component analysis of the ArCSQ

PCA extracted 11 components from the ArCSQ. Nineteen items were excluded based on the criteria by Swartzman et al., (1994) showing 4 distinct components. Extraction using the varimax rotation method was applied to extract 4 components. Table III-20 shows initial Eigen values and loadings of each item on its component after rotation. Component 1 contains items describing ignoring pain and increasing behavioural activity. It contained 4 items for IP, 2 items of CSS and 3 items of IBA. Component 2 describes confronting pain, due to the combination of 4 CSS and 1 item of the IPS, DA and RPS scales. Component 3 describes distractions, and contained 3 items of the DA, and 1 of the IBA subscales. Component only contained 3 of the 6 CAT items and therefore represented catastrophizing. The four components accounted for 52.17% of the variance in the CSQ, with Factor 1 explaining the highest variance of the total score at 31.18%.

Table III-20 Factor structure of the Arabic CSQ based on principal components analysis

CSQ subscale			Component 1	2	3	4
Extraction Sums of Squared Loadings		Eigen value	7.17	2.09	1.47	1.27
		Total variance (%)	31.18	9.09	6.39	5.51
		Cumulative variance (%)	31.18	40.27	46.66	52.17
Component 1: Ignoring Pain and Increasing Behavioural Activity						
IP	35	I ignore it.	0.80			
IP	24	I pretend it is not there.	0.79			
IP	21	I don't pay any attention to it.	0.65			
CSS	23	No matter how bad it gets, I know I can handle it.	0.63			
IBA	39	I do anything to get my mind off the pain.	0.59			
IP	17	I don't think about the pain.	0.55			
IBA	42	I do something active, like household chores or projects.	0.54			
CSS	20	I tell myself I can't let the pain stand in the way of what I have to do.	0.48			
IBA	34	I try to be around other people.	0.41			
Component 2: Confronting						
CSS	31	I see it as a challenge and don't let it bother me.		0.76		
CSS	6	I tell myself to be brave and carry on despite the pain.		0.73		
IP	30	I just go on as if nothing happened.		0.63		
CSS	8	I tell myself that I can overcome the pain.		0.59		
DA	9	I count numbers in my head or run a song through my mind.		0.54		
RPS	41	I pretend it is not part of me.		0.48		
CSS	32	Although it hurts, I just keep on going.		0.48		
Component 3: Distraction						
DA	27	I think of people I enjoy doing things with.			0.74	
DA	3	I try to think of something pleasant.			0.70	
DA	38	I think of things I enjoy doing.			0.68	
IBA	7	I read.			0.48	
Component 4: Catastrophising						
CAT	33	I feel I can't stand it anymore.				0.73
CAT	25	I worry all the time about whether it will end.				0.71
CAT	13	I feel my life isn't worth living.				0.62

Items dropped from PCA		
RPS	1	I try to feel distant from the pain, almost as if the pain was in somebody else's body.
IBA	2	I leave the house and do something, such as going to the cinema or shopping.
RPS	4	I don't think of it as pain but rather as a dull or warm feeling.
CAT	5	It is terrible and I feel it is never going to get any better.
RPS	10	I just think of it as some other sensation, such as numbness.
CAT	11	It is awful and I feel that it overwhelms me.
DA	12	I play mental games with myself to keep my mind off of the pain.
PH	14	I know someday someone will be here to help me and it will go away for a while.
PH	15	I pray to God it won't last long.
RPS	16	I try not to think of it as my body, but rather as something separate from me.
PH	18	I try to think years ahead, what everything will be like after I've got rid of the pain.
CSS	19	I tell myself it doesn't hurt.
PH	22	I have faith in doctors that someday there will be a cure for my pain.
DA	26	I replay in my mind pleasant experiences in the past.
PH	28	I pray for the pain to stop.
RPS	29	I imagine that the pain is outside of my body.
PH	36	I rely on my faith in God.
CAT	37	I feel like I can't go on.
IBA	40	I do something I enjoy, such as watching television or listening to music.

CSQ: Coping Strategies Questionniare; PCA: principal component analysis. Subscales: original subscale from Rosenstiel & Keef (1983); DA: Diverting Attention, RPS: Reinterpreting Pain Sensations, CAT: Catastrophizing, IPS: Ignoring Pain Sensations, PH: Praying and Hoping, CSS: Coping Self-Statements, IBA: Increasing Behavioural Activity

Component 1 "Ignoring Pain and Increasing Behavioural Activity", shows similarities to Ignoring Pain Sensations (IPS) subscale of Swartzman et al., (1994) and the IPS & CSS subscale of Tuttle et al., (1991). Tuttle et al., (1991) IPS & CSS subscale also included coping self-statements that this study found loaded on Component 2 and was named "Confronting" for the inclusion of items that describe coping self-statements, ignoring pain and one strategy of RPS. Therefore, this component was also overlapped with CSS subscale of Robinson et al., (1997), IPS subscale of Swartzman et al., (1994) and Cognitive Coping subscale of Harland & Georgieff (2003). Component 3 "Distraction", overlapped with 3 items from subscales also called Distraction by Robinson and Swartzman et al., (1994), Diversion by Harland & Georgieff (2003) and 3 items of RPS by Tuttle et al., (1991). The CAT items in component 4, "Catastrophizing", were included in a CAT subscale in other studies as well (Harland and

Georgieff, 2003; Robinson et al., 1997; Swartzman et al., 1994; Tuttle et al., 1991) but were not limited to those 3 items.

Inspection of the component transformation matrix (Table III-21) showed correlations of ≥|0.2|, indicating associations between the components and a need to test the item-loadings using an oblique rotation method. The oblique rotation method applied to extract 4 components and the items loaded on the same components as the results of the varimax rotation; which suggests that the underlying factors are indeed orthogonal (Burton et al., 1995; Swartzman et al., 1994).

Table III-21 Component transformation matrix

Component	1	2	3	4
1	0.67	0.60	0.43	0.04
2	-0.42	0.01	0.44	0.79
3	0.61	-0.53	-0.26	0.53
4	-0.07	0.59	-0.74	0.31

3.5 Discussion

3.5.1 Summary of findings

This study showed the ArRMDQ, ArBBQ and ArCSQ subscales are comprehensible and acceptable by Arabic-speaking and bilingual English and Arabic-speaking patients. The EnRMDQ was not difficult to translate to Arabic. The ArRMDQ had good agreement with the EnRMDQ, high short-term test re-test reliability, high internal consistency and acceptable item-by-item agreement for most of the items. The ArBBQ had good agreement with the EnBBQ, short-term test re-test reliability and internal consistency. The ArBBQ had moderate item-by-item agreement for most of the items. The ArCSQ subscales had good agreement with the EnCSQ, short-term test re-test reliability and internal consistency. The ArCSQ subscales had low to moderate correlations against the HADS subscales. PCA extracted 4 distinct coping strategies.

3.5.2 Translation and cross-cultural adaptation

There were very few disagreements between the translators with regards to the ArRMDQ. Similar findings were reported during the development of the Greek (Boscainos et al., 2003) and the Simplified Chinese (Fan et al., 2012) RMDQs. Discrepancies between translators were mainly related to grammatical sentence structure. The forward translators decided to retain

"Because of my back" to preserve the intention of the original RMDQ to determine disability due to all back symptoms, not just pain (Roland and Morris, 1983).

The expert committee found the ArRMDQ was generally clear; however items 6, 11 and 18 were adapted for the ArRMDQ to suit the clinical and cultural environment as discussed in the results. Other RMDQ translations have also had to amend colloquial phrases to maintain equivalence (Wiesinger et al., 1999), and consensus was not difficult to reach, similar to other translation experiences (Lee et al., 2011; Nakamura et al., 2003). Item 11 describes *bending and kneeling down*, which warrants further discussion within the clinical and cultural context. The expert committee was aware that this action could be interpreted in the context of lifting and handling or prayer positions. Patients are generally advised to bend from their knees and hips to protect their lower back when lifting heavy objects. Therefore the expert committee was careful to choose the phrase that described "bending a back" rather than "bending from their lower limbs". Additionally, this item had a cultural religious significance with regards to praying positions. The reciting of Muslim's prayer includes recitations in the following positions; standing, bowing with the placement of the hands on the knees, and kneeling on the floor. Clinicians in Bahrain advice patients to pray from a seated position (instead of standing) and to lean forwards in sitting (instead of bowing or kneeling on the floor). Prayer from a seated position is accepted in Islam if an individual is not able to stand and perform the routine, hence some patients tend to accept and act upon this advice. The expert committee did not alter the phrase to allude to the experiential equivalence of prayer positions. They were merely raising the point that patients are likely to draw on their prayer performance positions to answer this item. Additionally, they preferred to keep the item free of this religious dimension. Pious Muslims are likely to ignore clinical advice and pray in uncomfortable positions. In this case, they were worried the phrase will place emphasis on the extent of religious devotion.

In the case of the ArBBQ, disagreements between the translators were mainly about their choice of terms to describe a "bad back" and "back troubles". Testing of the Simplified Chinese version (Chen et al., 2011) found similar difficulties with translating "back trouble" into a linguistically and culturally appropriate term due to the colloquial nature of those phrases. Contact with the original developers, as recommended by the Beaton et al., (2000) guidelines, reassured the expert committee to use the phrase "back trouble(s)" or "troubles of the back" throughout and preserve the intention of the original BBQ while maintaining semantic and idiomatic equivalence. Otherwise, the expert committee found the translation of tasks, experiences and concepts in ArBBQ clear and maintained experiential and conceptual equivalence. Other changes to the colloquial phrases in the ArBBQ were mainly grammatical.

The EnCSQ contains more terminology that describes sensations and emotions than the BBQ and RMDQ, and consequently there were more disagreements between the translators regarding their choice of descriptive terms in versions T1 and T2. They were resolved by the translators and expert committee. The difficulties in word choice were expected given the presence of some colloquial phrases in the EnCSQ and the complexity of Arabic. Similar issues were encountered when translating the Pain Catastrophizing Scale into South African English, Afrikaans and Xhosa (Morris et al., 2012). Members of the expert committee easily obtained consensus on the items discussed to maintain cultural equivalence of the intended meanings. They reviewed items 43 and 44, and the presentation of the ArCSQ following suggestions from participants. Similar changes to these items were also made by the expert committee that reviewed the German version of the CSQ (Verra et al., 2006).

Layout changes to the CSQ have not been reported elsewhere. In this case, the expert committee decided to repeat the scale to serve as a visual cue to preserve the 0-6 point scale of the CSQ (Ustun et al., 2010). The adaptation preserved the 0-6 point scale of the CSQ compared to other studies that have reduced multi-point scales to facilitate response (Lee et al., 2002). The recommendation was also intended to encourage patient participation in a culture where healthcare research and patient involvement is not very common (Sweileh et al., 2014). Individuals of different cultures respond differently to items using multiple-point scales (Lee et al., 2002). The use of different response formats to suit cultural needs is acknowledged (see 3.1.1). This could be due to exposure to research, literacy or nature of their responses (e.g. extreme or neutral responses) (Chachamovich et al., 2009; Lee et al., 2002). This patient population was not illiterate. However, they are inexperienced in research participation and improving their research experience could improve acceptability.

3.5.3 Comprehensibility and acceptability

Previous RMDQ translation and cross-cultural adaptation studies reported good comprehensibility and acceptability for different patients of different cultures, and this was also true for the ArRMDQ (Bejia et al., 2005; Boscainos et al., 2003; Grotle et al., 2003; Lee et al., 2011). The 8 patients testing item-by-item comprehension reported no problems. On the contrary, some expressed satisfaction because the ArRMDQ addressed topics not always discussed with the clinicians and prompted further discussion with the researcher. One patient thought it would be interesting to use as a treatment outcome measure.

The comments from participants piloting the ArBBQ and ArCSQ demonstrated patients' thought processes, stimulated discussions to describe their coping style and beliefs rather than misunderstandings. For example, patients expressing disagreement with 8 ArCSQ items

outlined in the results section, has informed us that patients find it difficult to reinterpret pain sensations (disagreed with 4 out of 6 items) and ignore some pain sensations (item 19 and 2). Participants strongly disagreed with 2 items from the CAT subscale; item 13: *I feel my life isn't worth living* and item 37: *I feel like I can't go on* because participants felt it described "giving-up on life" which was not acceptable in Islam and a Muslim culture (Al-Sabaie, 1989; Ali et al., 2004). The expert committee had anticipated this reaction from patients and efforts were made to ensure the items reflected activities of daily living in general.

Patients' expressed confusion when rating items 18 and 25 which address long-term outcomes of pain. Similar reactions were found with items 2, 3 and 10 of the ArBBQ. Reasons for confusion could include; diversity of advice and prognosis received from healthcare professionals (Liddle et al., 2007; Verbeek et al., 2004), diversity of patients' presentations and needs (Liddle et al., 2007; Verbeek et al., 2004), and lack of acceptance and hope that their condition would resolve (Campbell and Guy, 2007; Campbell et al., 2009; Reid, 2004). Patients found some ArBBQ items and ArCSQ items were dependant on faith in God. ArCSQ items showed that participants were also likely to externalize their coping and control over pain, and believe that their level of control was dependent on their faith in God (Ali et al., 2004; Inayat, 2005; Walpole et al., 2013). Some ArCSQ responses indicated that coping strategies were practiced but within a religious context. For example, participants describe listening or reciting prayer instead of listening to the television or running thoughts in their minds. These comments gave insight on how some patients in this Arabic culture cope and reflect on chronic LBP (Ali et al., 2004; Campbell and Guy, 2007). Although such coping mechanisms predict poor outcomes in Western cultures (Edwards et al., 2005; Jordan et al., 1998; Lamé et al., 2005; Turner et al., 2000b), religious coping behaviours can provide meaning and promote acceptance, responsibility and hopefulness, which can reduce negative responses to chronic pain (Campbell et al., 2009; Cardosa et al., 2012; Maki et al., 2014a; Walpole et al., 2013). These coping mechanisms, under appropriate circumstances, can promote positive coping (Campbell et al., 2009; Cardosa et al., 2012; Rippentrop et al., 2005; Walpole et al., 2013).

There were very minimal comprehension-related issues reported from participants independently completing the Arabic versions at the piloting stage. None of the patients completing the ArRMDQ reported any problems with comprehension. They found it quick and easy to complete. Illiterate patients found it easy to understand when read verbatim, as in other translations (Bejia et al., 2005; Fan et al., 2012; Nusbaum et al., 2001). Previous studies also found the RMDQ easy to administer, with few misunderstandings or declining participation, or requiring major adjustments (Bejia et al., 2005; Boscainos et al., 2003; Grotle et al., 2003; Kovacs et al., 2002; Lee et al., 2011; Wiesinger et al., 1999). The simplified Chinese

(Fan et al., 2012) and Persian (Mousavi et al., 2006) versions found missing data for the ODI when compared to the RMDQ particularly in the sex life subscale which the RMDQ does not contain. The ODI was adapted into Arabic. Patients did not find the sex life subscale acceptable and the authors removed it (Guermazi et al., 2005). Patients of more conservative cultures might not be comfortable with such topics (Fan et al., 2012; Hammoud et al., 2005). Thus, the RMDQ may be more culturally-appropriate than the ODI in these cultures.

With regards to the ArBBQ, three participants asked to explain the phrase "alternative treatments" in item 9. Patients were instructed to answer based on their understanding of what the phrase meant. Ambiguity over what constitutes as "alternative" treatment or therapies has been documented previously (Zollman and Vickers, 1999). Patients were concerned whether *Hijama* (wet cupping), massages given by traditional masseurs, and *Al-kay* (cautery) were included under that umbrella term. These treatments are common in the Gulf Region (AlBedah et al., 2011; Hajar Albinali, 2003), see 1.2.1. They are also occasionally performed by orthodox doctors, which blurs the line between "alternative" and "conventional" therapy if "alternative treatment" is defined as therapy given outside the context of orthodox hospital medicine (Eisenberg, 1997; Hajar Albinali, 2004; Zollman and Vickers, 1999). The expert committee felt the selected Arabic phrase maintains conceptual equivalence with the English version and allows patients to decide what they believed was included under that umbrella term and its effectiveness in managing back trouble.

In the case of the ArCSQ, only two participants asked the researcher to explain "numbness" in item 10. Again, the participants were asked to answer based on how they perceived and reacted to their pain experience. Numbness is a common symptom associated with LBP, so participants were unsure how the sensing the symptoms was considered a coping strategy. The omission of this item following the PCA, discussed later, could be a consequence of this issue.

3.5.4 Comparison of English and Arabic versions of the questionnaires by bilingual patients

The EnRMDQ and ArRMDQ had high global agreement and most item-by-item statistics between the EnRMDQ and the ArRMDQ. The mean difference at 0.53 is close to zero, indicating only slight differences between first test and re-test (Wiesinger et al., 1999). The limits of agreement are within the estimates of minimal clinical change of 4-5 (Stratford et al., 1996; Stratford et al., 1998), therefore showing good agreement.

There was high agreement between the 5 EnCSQ and ArCSQ subscales and most of the items showing moderate to high item-by-item agreement. There ArBBQ had acceptable agreement to the EnBBQ. However, the limits of agreement on Bland-Altman plots and 95% confidence intervals were large of both ArBBQ and ArCSQ subscales compared to their respective English versions.

Most item-by-item reliability statistics between the EnBBQ and the ArBBQ were of fair to moderate agreement. Item 2 was reviewed by the authors and expert committee and was found to be accurate, despite the no agreement shown by its Kappa value (K = -0.08). Item 2 discusses the potential inability to work due to LBP. A large proportion of the samples were female homemakers. Therefore "work" could be interpreted differently, to include employment, or housework. Earlier, it was discussed that participants were hesitant to answer some items, including item 2 on the ArBBQ due to difficulties accepting the chronic nature of their condition and hope that it would resolve (Campbell and Guy, 2007; Campbell et al., 2009; Reid, 2004)

There is a lack of guidance on interpreting results of comparisons between original and translated versions of self-report outcomes, even though this is part of the adaptation process recommended by Beaton et al., (2000). It is difficult to assess whether differences in scores are due to translation or the actual differences in populations. Therefore it is recommended that local bilingual patients complete the original and newly translated versions. There are several issues that could explain why some scales or items had acceptable or lower agreement. First of all, a small sample was used to assess this aspect of the cross-cultural procedure due to the difficulty of recruiting bilingual LBP patients meeting the eligibility criteria (n= 17). This could have affected the wide limits of agreement seen on the Bland-Altman Plots particularly for the ArBBQ and ArCSQ subscales. Second of all, it is possible that items containing emotions, sensations or beliefs (particularly praying and hoping to God) could impact participants differently in different languages regardless of their fluent abilities in both English and Arabic languages. And lastly, it is difficult to fully comment on the agreement without additional testing of the responsiveness of these scales in their target population. Regardless of the limitations, the results give an insight to the agreement of the Arabic and English versions.

3.5.5 Psychometric properties

Reliability

The ArRMDQ demonstrated good reliability. Most of the items of the ArRMDQ had good item-by-item agreement and comparable to other versions; Moroccan (Mâaroufi et al., 2007) and

Hong Kong Chinese (Tsang, 2004). The ICC value 0.90 (0.75–0.95) is similar to the EnRMDQ 0.91 (Roland and Morris, 1983) and within the range reported in the literature for other versions of the RMDQ ranging from 0.83 for the Norwegian RMDQ (Grotle et al., 2003) to 0.95 of the Brazilian-Portuguese RMDQ (Costa et al., 2007b). The Bland-Altman plot had limits of agreement (+4.817, -3.676) that are within the levels of clinical change of 4-5 when the mean (SD) of the ArRMDQ = 10.53 (4.80) is taken into account showing good short-term repeatability (Stratford et al., 1996; Stratford et al., 1998).

The ArBBQ had good psychometric properties, comparable to other versions of the BBQ. The ArBBQ had high test re-test reliability ICC=0.80 (0.68–0.87) (Fleiss, 2011). Other versions of the BBQ had slightly higher ICC scores; EnBBQ 0.87 (Symonds et al., 1996), Simplified Chinese 0.88 (Chen et al., 2011) and Traditional Chinese 0.85 (Burnett et al., 2009). All the other versions included participants with no LBP, which could have biased the test re-test findings since the fluctuating nature of LBP may result in variation in back beliefs. Bland-Altman Plots show a difference of +12.63, -8.00 around the mean for test re-test reliability of the ArBBQ. Changes of 2-3 points in BBQ scores, smaller than the observed limits of agreement, have been reported as statistically significant differences following intervention (Buchbinder and Jolley, 2005; Buchbinder et al., 2001a; Buchbinder et al., 2001b; Burton et al., 1999; UKBEAM, 2004) however a minimally clinically important difference (MCID) has not been calculated. When a MICD has not been established, differences of means between 'known groups' can be used as a proxy (McIntire and Miller, 2007). A 20 point difference in mean BBQ scores of 'known groups'; individuals off work due to LBP and those still working, has been reported (Symonds et al., 1996). Although it is not an MCID, it could be used to interpret the observed limits of agreement. Therefore, the observed limits of agreement are probably acceptable because they are smaller than the differences between 'known groups'. These findings support results for both constructed Bland-Altman Plots showing acceptable English to Arabic agreement and short-term reliability testing of the ArBBQ. However, it is important to note that it is difficult to fully comment on these limits without additional testing of the responsiveness and MCID of the ArBBQ in its target population.

Test re-test agreement was also high for all ArCSQ subscales (ICC = 0.85-0.96), ICC scores ≥ 0.75 are expected to have good test re-test reliability (Fleiss, 2011), and all items had at least moderate item-by-item agreement. The results of short-term reliability similar to other versions (Main and Waddell, 1991; Verra et al., 2006). It is acknowledged that *F*-test p values for ArRPS, ArCAT and ArCSS were $p < 0.05$ indicating the possibility of a systematic error. However the samples size for short-term reliability testing was small. The p values for *F*-tests can be affected by sample size (Tiku, 1971).

Internal consistency

Further reliability testing showed that the ArRMDQ, ArBBQ and ArCSQ subscales with the exception of ArPH had high internal consistency. The ArRMDQ had a high Cronbach's alpha of 0.73. It was lower than the EnRMDQ reported between 0.84–0.93 (Roland and Fairbank, 2000) and other RMDQ versions between 0.81 (Wiesinger et al., 1999), to 0.94 (Albert et al., 2003; Bejia et al., 2005; Grotle et al., 2003). The lower internal consistency of the ArRMDQ could be explained by the relevance of some RMDQ items. For example, it is not common for individuals of a conservative Islamic culture to accept help when dressing (Hammoud et al., 2005) (item 19, *Because of my back pain, I get dressed with help from someone else*). The alpha score would be slightly higher at 0.74 if item 19 was deleted. The ArBBQ had high internal consistency. The removal of items 1 and 13 is not suggested because the ArBBQ had high internal consistency (≥0.70) (Cronbach, 1951; Terwee et al., 2007) with the inclusion of all 9 inevitability items. Items on the ArRMDQ and ArBBQ were retained to maintain the standardization of the tool and as the alpha was within recommended internal consistency values of 0.70-0.90 (Roland and Fairbank, 2000).

The ArCSQ subscales had high internal consistencies that were comparable to other versions of the CSQ (Rosenstiel and Keefe, 1983; Verra et al., 2006). The acceptable internal consistency of the ArPH was not similar to high internal consistency results found in the original (Rosenstiel and Keefe, 1983) and German (Verra et al., 2006) versions of the CSQ. After item-by-item analysis of internal consistency, the removal of item 18 is not suggested. The increase in the internal consistency of ArPH is not statistically meaningful. Cronbach's alpha ≤ 0.70 could suggest items in a scale do not measure the same concepts (Cronbach, 1951; Terwee et al., 2007). Concepts of praying (to God) and hoping (no religious dimension) to Muslims might vary considerably.

Validity

The ArRMDQ correlated fairly with pain intensity ($r = 0.26$ $p < 0.01$). A moderate association of ≥0.30 is expected between pain and disability as seen from the Moroccan r=0.32 (Mâaroufi et al., 2007), Tunisian r=0.33 (Bejia et al., 2005), and Spanish versions r=0.35 (Kovacs et al., 2002). The lower correlation coefficient of the ArRMDQ could be explained by the lower relevance of some RMDQ items to couple pain in this population for the same reasons discussed previously for internal consistency.

Overall the ArBBQ had good construct validity when compared to the FABQ. The ArBBQ had a moderate inverse association to the overall FABQ score ($r = -0.33$), meaning the more positive a participant was the less likely they were to be fear-avoidant. The correlation between the

ArBBQ and FABQ-pa was moderate, and low when compared to FABQ-w. It would have been expected for the ArBBQ to have a moderate association to FABQ-w since the BBQ assess attitudes and beliefs about the work-loss and absence. Other translated version of the BBQ found a higher association between the BBQ and FABQ-w subscale (r = -0.45 Simplified Chinese (Chen et al., 2011)) and low associations to FABQ-pa (r = -0.02 Traditional Chinese (Burnett et al., 2009), and r = -0.19 Simplified Chinese (Chen et al., 2011)). There are a few reasons for these differences with both Chinese versions. Both Chinese studies included healthcare professionals, with or without LBP, in their samples whereas this study only included LBP patients, arguably making findings from this thesis more valid. Additionally, all of their participants were in paid employment compared to this study that could have contained a mixture of working statuses including housewives; therefore their interpretation of housework as work, chores or responsibilities on the outcome measures could have varied according to personal interpretation and cultural expectations (Maki et al., 2014a).

With regards to the construct validity of the ArCSQ subscales, the strongest association found between the ArCSQ and HADS subscales was between ArCAT and HADS-anx. Other studies (Keefe and Williams, 1990; Main and Waddell, 1991; Tan et al., 2001) found the strongest association between measures of depression, anxiety and distress against the CAT subscale. Although the association between HADS-dep and ArCAT was significant, it was determined to be a low association. The differences in this study's findings might be attributed to the use of a self-report measure that distinguishes between depression and anxiety, whilst other studies have used measures that combine depression, anxiety and distress.

The moderate association between ArCOP, ArADP, ArIPS and both HADS subscales, and the moderate association between ArIBA and HADS-dep were higher than associations reported in previous studies (Keefe and Williams, 1990; Main and Waddell, 1991; Tan et al., 2001). Low associations from Keef & Sullivan (1990) and Tan et al., (2001) were based on findings from mixed chronic pain populations, which may make results of this study more specific to LBP patients. On the other hand, Main & Waddell (1991) found no associations from a similar sample size, inclusion and exclusion criteria. Perhaps results from this thesis are specific to the population and setting; participants in this Arabic culture were more likely to feel symptoms of depression and anxiety when they were unable to control or decrease their pain levels, ignore their pain and increase behavioural activity.

The low association between ArCSS and HADS-dep was similar to the association reported by Keef & Sullivan (1990) (r = -0.29) and close to the association reported by Tan et al., (2001) (r=

-0.32). Two other studies reported no association between depression and the CSS subscale (Main and Waddell, 1991; Sullivan and D'Eon, 1990).

There were no associations between the ArDA and ArRPS subscales to HADS. Similar findings were found by Tan et al., (2001), however Main & Waddell (Main and Waddell, 1991) found a moderate and low correlation, respectively against the Zung Depression Inventory. This may be because these forms of coping are infrequently employed by this population. For example, one participant disagreed with the use of diverting attention as a coping strategy (items 3 and 9) and reinterpreting pain sensations (items 4 and 41).

The low correlations between ArPH and both HADS subscales could indicate that praying and hoping was not considered as a coping strategy but as the norm. This is supported by participants' surprise at questions about praying and hoping in the ArCSQ. Overall, the ArCSQ had good construct validity when compared to the HADS depression and anxiety subscales. Differences in the strength of associations between the Arabic subscales and English subscales could be attributed to the population's religious beliefs and cultural norms (Azhar and Varma, 1995; Walpole et al., 2013), especially when compared against results of a study with similar selection criteria (Main and Waddell, 1991).

Principal component analysis

The PCA identified 4 distinct components from the CSQ. All items of the ArPH subscale were omitted, perhaps for reasons discussed earlier. Harland & Georgieff (2003) omitted the PH subscale due to the subscale's low internal consistency and reduced the CSQ to 23 items and one effectiveness item (CSQ-24). They omitted 19 items similarly to this study, of which 16 are the same.

The elimination of 5 out of 6 of the ArRPS subscale complemented participants' disagreements with items from this scale. Previous analyses retained most of the RPS subscale (Robinson et al., 1997; Swartzman et al., 1994; Tuttle et al., 1991). This supports the earlier view that coping varies between cultures, and RPS was not a common coping strategy (Al Attia and Al Abbasi, 2011). Harland & Georgieff (2003) retained items from the RPS subscale, however found that it lacked associations with any other outcome measures. Components 1 to 3 showed similarities and differences to other factorial structures reported in the literature. Component 4 "Catastrophizing", showed the most similarities across the original (Rosenstiel and Keefe, 1983) and different studies (Harland and Georgieff, 2003; Robinson et al., 1997; Swartzman et al., 1994; Tuttle et al., 1991). However this study only contained 3 of the 6 original items. One of the 3 omitted items (37) was debated by the expert committee and two patients for negatively describing "giving-up on life" which is not acceptable in the Muslim culture.

The four-factor structure improved the researcher's understanding of the relevance and meaning of coping strategies to this patient population. Promoting meaningful coping strategies in clinical settings could improve outcomes. For example, patients try to ignore pain using a variety of strategies. Re-enforcing the active behaviours from the ArIBA subscale identified from *Component 1: Ignoring Pain and Increasing Behavioural Activity* (such as 34: *being around other people* or 42: *household chores*) could encourage active coping. The elimination of three items of the ArIBA subscale (2: *cinema or shopping* or 40: *watching television or listening to music*) shows that this population has not identified these activities as a meaningful coping mechanism. This is supported by earlier comments from participants involved in the comprehensibility assessment of the ArCSQ subscales. For example, a participant was more likely to go to a house of worship rather than to the cinema or shopping. Islam encourages Muslims to pray in mosques. Houses of worship are also considered prime locations for social gatherings and exchange of information. Hence, frequenting mosques is not limited to religious duties; it promotes physical activity and spending time with others (Padela et al., 2011). Another participant had mentioned that he was more likely to listen to prayer than to music. Islamic teachings encourage the ill to pray and keep faith (see 1.4.3). This explains the reason behind this participant's response. There was a moderate inverse association between ArIBA and depression. These findings suggest that educating patients in Arabic or Muslim clinical settings to increase active, rather than passive strategies, could improve depression.

3.5.6 Limitations

The study examined a limited number of psychometric properties. With regards to validity; only construct validity was assessed. Although construct validity measures the relationship between each tool and the dimensions it is expected to measure, other forms of validity such as face validity of the items could have been measured. The examination of item face validity could have contributed to the researcher's findings on the appropriateness of each item in a new culture in translation and cross-cultural adaptation studies, and provided evidence the removal of items dropped from the PCA analyses. Although testing the comprehensibility and acceptability of the questionnaires was not a formal method of testing item's face validity, it did provide this study with insights to patients' understanding of the items.

Another limitation was that the study only measured correlations between the ArRMDQ, ArBBQ and ArCSQ subscales to one dimension they postulate to measure. For example, the ArRMDQ's correlation to pain intensity was only fair. This suggests that the ArRMDQ might be associated more with other dimensions it postulates to measure in Arabic-speaking patients. It is recommended that future studies assess its association to other outcome measures, such as

quality of life or other scores measuring function (Grotle et al., 2003; Opara et al., 2006; Wiesinger et al., 1999). Further assessment of construct validity to other dimensions was limited by the availability of other published and validated self-report outcome measures available in Arabic. It is also important to note that the responsiveness and MCIDs of the three questionnaires have not been tested in their target populations. Assessing the responsiveness of cross-culturally translated and adapted questionnaires helps ensure that outcome measures demonstrate the measurement property it intends to measure (Beaton et al., 2000). Additionally, the calculation of the MCIDs could have aided the interpretation of the Bland-Altman plots, especially when one was not available (e.g. English BBQ). Aiding this interpretation could have added to the confidence in interpreting results of test re-test reliability.

Although results of the PCA showed a four-factor structure for the CSQ following the elimination of 19 items, all items were retained in the final ArCSQ. This decision was made for multiple reasons; (1) the four-factor structure of the ArCSQ warrants further psychometric testing and investigation of clinical utility with Arabic-speaking patients because in addition to the elimination of some items, others loaded on subscales that are different to the original and previous versions, and (2) maintaining the original structure as suggested by Rosenstiel & O'Keefe (1983) allows for the comparison of results with the available literature. It is felt that the decision to remove ArCSQ items or subscales should be proceeded by further testing as suggested. Therefore it is recommended to include all ArCSQ items and subscales in future work until further testing has been carried out.

3.5.7 Clinical implications

All three outcome measures showed good comprehensibility and acceptability from Arabic-speaking LBP patients. This encourages the use of these outcome measures to assess LBP disability (ArRMDQ), beliefs about the consequences of LBP (ArBBQ) and to identify patients' coping strategies (ArCSQ). The results of the comprehensibility and acceptability testing show that Arabic patients are hesitant discussing long-term consequences of LBP, perhaps due to lack of acceptance of the chronic nature of their condition and hope for improvement. In addition to the comments, the PCA analysis of the ArCSQ identified active coping strategies that are meaningful to Arabic and Muslim patients. Clinicians are encouraged to promote the use of these strategies to help patients decrease their LBP disability.

There is minimal published data on LBP disability in Arabic-speaking populations. The availability of a tool in the target population's language should encourage research and clinical audit. Standardisation of data collection through the use of a valid and reliable outcome

measure will allow comparison with other research findings. Clinically, the tools can be used to measure patient-related outcomes and to develop or improve patient services.

3.6 Conclusions

The ArRMDQ, ArBBQ and ArCSQ had good comprehensibility and acceptability to Arabic-speaking LBP patients. All three outcome measures had acceptable psychometric properties that are comparable with other language versions. Differences between the Arabic versions and others show possible differences in Muslim Arabic LBP patients' perception of LBP disability, beliefs about low back pain, and pain coping strategies. The creation of an Arabic version of these outcome measures could be useful in clinical practice or research across the Middle East or countries with Arabic-speaking migrants.

3.7 Chapter summary

The literature review (Chapter 1) and systematic review (Chapter 2) showed that there were no valid and reliable outcome measures to measure self-report LBP disability, beliefs about LBP and coping strategies in Arabic. Therefore, the RMDQ, BBQ and CSQ, respectively, were translated and cross-culturally adapted into Arabic. The questionnaires were piloted with Arabic-speaking LBP patients to assess comprehensibility and acceptability, followed by testing with English and Arabic-speaking LBP patients to assess the translation. The questionnaires were assessed for construct validity, internal consistency and short-term test re-test reliability to determine some of their psychometric properties. The Arabic versions of the RMDQ, BBQ and CSQ had good comprehensibility and acceptability to Arabic-speaking LBP patients. All three outcome measures had acceptable psychometric properties that are comparable with other language versions. It is recommended that all of them are used with Arabic-speaking LBP patients in the future. The questionnaires could be used to assess for the relationships between LBP disability (RMDQ) and other dimensions it is expected to correlate to, to inform the development of the physiotherapist-led PMP.

Chapter IV: Determinants of self-report disability in Bahraini patients with low back pain

4.1 Introduction

The review (Chapter 1) has introduced LBP as a common cause of disability, participation limitation and reduced quality of life. The review also showed that pain and other biomedical factors, such as characteristics and duration of symptoms, and clinical or radiological findings, do not fully explain LBP disability (1.1.2). Western studies have identified factors such as beliefs and attitudes about back pain, including poor recovery expectations, fear of pain, and work loss; coping mechanisms; psychological distress, including depression and anxiety as cross-sectional associates of and important predictors of persistent LBP and disability (1.4).

Cross-sectional observational studies have found low to moderate associations between LBP disability and fear-avoidance beliefs (Chan and Chiu, 2008; Crombez et al., 1999; Korkmaz et al., 2009; Laufer et al., 2012) and in the previous systematic review (Chapter 2). Others have found moderate relationships with catastrophizing (Kovacs et al., 2011; Linton, 2000; Peters et al., 2005; Wertli et al., 2014b) and with symptoms of psychological distress and (Aceves-González and Prado-Leon, 2008; Carroll et al., 2004; Croft et al., 1995; Pincus et al., 2002). The strength of cross-sectional evidence for other coping strategies including the PH has varied between studies set in different countries (see 1.4.3), however most findings suggest that the relationship between PH and LBP disability is weak (Jensen et al., 1994b; Turner et al., 2000b). Hispanic and African Americans were found to use praying and hoping more than other ethnicities in North American studies (Edwards et al., 2005; Jordan et al., 1998).

Previous studies have assessed relationships between personality traits (Kent and Keating, 2008; Linton, 2000; Pincus et al., 2002; Truchon and Fillion, 2000; Van Der Hulst et al., 2005), and locus of control (Crook et al., 2002; Kent and Keating, 2008; Truchon and Fillion, 2000; Van Der Hulst et al., 2005) to low back pain and disability. The utility of findings related to personality traits has been limited in the development of pain management programmes (Pincus et al., 2002). Additionally, locus of control and self-efficacy could be seen as personality traits (Truchon and Fillion, 2000), or difficult to target directly. It can be assumed that their modification potentially lies in challenging and modifying pain-related beliefs (Asghari and Nicholas 2001; Main et al., 2010). Before embarking on an examination of factors associated

with LBP disability in Bahrain, a systematic review (Chapter 2) was conducted to review factors associated with LBP disability in non-Western cultures to determine what factors were of interest and measured, and hence were associated with or predicted LBP disability. The review found some factors such as FABs, catastrophizing, locus of control, coping and psychological distress were explored in some studies. Findings show that the psychosocial factors were understudied compared to bio-medical factors. Therefore, there was only strong evidence only for a relationship between fear-avoidance beliefs and disability; ranging from low (r = 0.21) to moderate (r= 0.45). Other factors showed a cross-sectional association with LBP disability, however due to the low methodological quality and small number of studies, findings were found to be inconclusive. Additionally, the review found a lack of outcome measures to measure LBP disability, back-related beliefs (BBQ) and pain coping strategies (CSQ) in Arabic (3.1.2). Therefore in Chapter 3, appropriate tools were translated and cross-culturally adapted into the language and culture of interest.

4.1.1 Rationale

The ability of the aforementioned factors to explain disability and predict changes in outcome, in addition to the assumption that they are *modifiable* compared to other bio-medical and psychosocial factors, has encouraged researchers and clinicians to consider them in the planning and delivery of LBP management options in the West (1.4). Although it has been found that modification of psychosocial factors result in reduced levels of LBP disability, it cannot be assumed that the same factors are associated with baseline LBP disability in a predominantly non-Western culture such as Bahrain. It is expected that the relationship between psychosocial factors and LBP disability might be different; particularly a stronger cross-sectional relationship to PH than is reported in the West This is because pain is influenced by culture due to its psychological, social, physical and spiritual dimensions (see 1.1.3), and this influence has implications for the design and implementation of a LBP management strategy acknowledging beliefs and behaviours in Bahrain. However, findings from Chapter 2 showed that the cross-sectional evidence between the identified psychosocial factors and LBP disability is similar to Western findings. If the association between the aforementioned psychosocial factors targeted in Western PMPs is similar to the relationships observed with Bahraini LBP patients, this would encourage the inclusion of these factors in the physiotherapist-led PMP being developed. Taking culture-specific findings into consideration is expected to improve the feasibility and acceptability of the intervention.

A cross-sectional survey investigating some psychosocial factors that are associated with LBP in Bahrain is necessary to inform the design a pain management program. A cross-sectional survey will allow for the identification of a relationship between the selected psychosocial

factors and LBP disability. Although this study design does not allow for casual inferences, or the identification of predictors of change in LBP disability; pragmatically it is serves as an initial exploration of cross-sectional relationships between LBP disability and the aforementioned psychosocial factors before longitudinal studies, impractical for this thesis, can be conducted.

4.2 Aims

This study will aim

a) to examine associations between pain intensity, back-related beliefs, fear-avoidance beliefs, coping strategies, and depression and anxiety with self-report LBP disability in Bahraini patients with LBP;
   and
b) to examine whether pain intensity, back-related beliefs, fear-avoidance beliefs, coping strategies, and depression and anxiety explain the variance in self-report LBP disability in Bahraini patients with LBP.

4.3 Methods

4.3.1 Ethical approval

Ethical approval was obtained from King's College London Biomedical Sciences, Dentistry, Medicine and Natural & Mathematical Sciences Research Ethics Subcommittee (BDM/12/13-36) and Bahrain Ministry of Health Ethical Approval Committee (HM/SA/780/2013) (Appendices 6 and 7).

4.3.2 Participants

Four outpatient physiotherapy departments in Bahrain were recruited to participate in this study Table III-1 (see 3.3.3).

Inclusion and exclusion criteria

Patients aged 18 years or older with back pain, with or without leg symptoms lasting for more than three months were recruited from four outpatient physiotherapy sites in Bahrain. Reasons for exclusion were a diagnosis of inflammatory disease, spinal fractures or recent surgery (less than 1 year ago), or pregnancy. Patients recruited to assess comprehensibility and acceptability, bilingual testing (see 3.3.3) and test-retest reliability (see 3.3.4) of the Arabic RMDQ, BBQ and CSQ were not included in the analyses of this study.

Sample size calculation

Sample size was calculated to detect at least a moderate (r≥ 0.30) correlation coefficient between RMDQ and FABQ, based on the reviewed literature (Chapter 1 and 2). At 90% power using a 5% significance level, 98 participants would be required. A Bonferroni correction was applied to adjust the sample size for multiple comparisons using regression models (Pallant, 2005; Sterne et al., 2009). This adjusted the sample size to a minimum of 132 participants to detect the relationship with 90% power (α = 0.0125). Therefore, the aim was to collect data from 200 participants to allow for missing data and incorrectly filled questionnaires.

Recruitment

Physiotherapists at the four outpatient sites in Bahrain were trained in explaining the research purpose to potential subjects and recruiting participants. The physiotherapists, with the supervision of the researcher, identified potential participants in their current case load who met the eligibility criteria. Eligible participants were given the information sheet (Appendix 10) by the physiotherapists. Participants were followed up by the researcher 1 to 3 days later and given the questionnaires. Participants were instructed to seal the questionnaire in an envelope provided to them by the researcher and place it in a locked box located in their outpatient physiotherapy department. Participation was anonymous. A numerical coding system was used to identify hospital site.Therefore, participants were informed verbally and in the information sheet that filing out and returning the questionnaire, indicated consent to participation and once the questionnaire is returned to the locked box it was not possible to withdraw their participation due to no patient-identifiers. Participants were allowed to take the questionnaire away from the premises to consider participation and able to withdraw at any time before submitting their questionnaire.

Pilot

Twenty participants were asked for feedback on their experience to improve the participation experience. The first 10 patients agreeing to participation were approached on completion of the questionnaire for feedback on participation. The following topics were addressed:

1. Duration of time it took to complete the questionnaire (Participants completing the questionnaire on site were timed. Participants who took the questionnaires home were asked to time themselves.)
2. The clarity of the instructions and items.
3. Participants were invited to give their impression on participation.

The researcher asked the first 10 participants who declined participation or accepted to participate and later informed the researcher that they have not returned the questionnaire for their reasons why.

4.3.3 Outcome measures

Roland-Morris Disability Questionnaire

The RMDQ is a self-report outcome to measure LBP disability (see3.1.2) is a binary (yes or no) 24-item tool. Participants score a point for each 'yes' enabling them to score between 0-24 points. A higher score indicates higher levels of LBP disability. The Modern Arabic Standard (Arabic) version of the RMDQ is simple to understand and complete, has high internal consistency and reliability, and acceptable validity to pain intensity in Arabic-speaking LBP patients (Maki et al., 2014b, Chapter 3). (See: Appendix 11: Arabic Roland-Morris Disability Questionnaire).

Back Beliefs Questionnaire

The BBQ is a 14-item, self-report tool that measures attitudes and beliefs concerning the future consequences of LBP (see 3.1.2). All items are scored using a 1-5 Likert Scale. The score is calculated by reversing and summing the inevitability scale. Thus participants score between 9-45 points. A low score indicates higher levels of negative back-related beliefs. The BBQ has shown good reliability and validity (Chen et al., 2011; Symonds et al., 1996). The Arabic version of the BBQ had good comprehensibility and acceptability to Arabic-speaking LBP patients, and good psychometric properties that were comparable with other BBQ versions (Maki et al., 2016, Chapter 3). (See: Appendix 12: Arabic Back Beliefs Questionnaire.)

Pain Coping Strategies Questionnaire

The CSQ is a self-report tool that measures strategies patients with chronic pain use to cope with their pain (see 3.1.2). It consists of 44 items that make up 7 subscales with 7 items each can range from 0-36 points, two effectiveness items (0-6 points each). Higher scores indicate more usage of the coping strategy. In Chapter 3, results show that the Arabic version of the CSQ had good comprehensibility and acceptability to Arabic-speaking LBP patients. The Arabic CSQ subscales also had good psychometric properties that are comparable with other versions of the CSQ. The four-factor structure suggested in Chapter 3 will not be used because it has not been investigated for its psychometric properties, and the usage of the original CSQ subscales will allow the researcher to compare findings in light of the existing literature. (See: Appendix 13: Arabic Coping Strategies Questionnaire.)

Fear-avoidance Beliefs Questionnaire

The FABQ is a 16-item, condition specific, self-report tool that measures beliefs associated with avoidance with regards to general physical activity (FABQ-pa) and physical activity at work (FABQ-w). The questionnaire uses a 0-6 Likert Scale. FABQ-pa is calculated by summing items 2, 3, 4, and 5, (range 0-24) and FABQ-w is the sum of 6, 7, 9, 10, 11, 12, 15 (0-42). The remaining items are distractor items. Higher scores indicate higher levels of fear-avoidance beliefs (Waddell et al., 1993). The Arabic version of the FABQ has been shown to have acceptable validity and reliability (Laufer et al., 2012).

Hospital Anxiety and Depression Scale

The HADS is a 14-item self-report tool to measure anxiety and depression in patients (7 anxiety items (HADS-anx) and 7 depression items (HADS-dep)). The scale uses a 0-3 Likert Scale. Each subscale's score can range from 0-21 points with a higher score indicating higher levels of anxiety or depression. A valid Arabic version of the HADS was used (El-Rufaie and Absood, 1995; El-Rufaie and Absood, 1987).

Pain intensity on a Visual Analogue Scale

The VAS is a valid and reliable tool used to measure self-report pain intensity (Roach et al., 1997; Williamson and Hoggart, 2005). Participants are asked to indicate their "pain intensity today" on a 0-100mm horizontal line, where 0mm indicates no pain and 100mm indicate maximum pain.

Socio-demographic characteristics

Patients' socio-demographic characteristics; age, gender, marital status, education level, work status, nature of work, and history of LBP (duration and reason for pain) were collected, see: Appendix 14.

4.3.4 Data Analyses

Descriptive statistics

Descriptive statistics were calculated for participant socio-demographic, clinical characteristics and all outcome measures. (Descriptive statistics were calculated for original and pooled data following imputation see 4.4.2).

Normality assessments

Data from all outcome measures was assessed for normality using Kilmogorov-Smirnov and Shapiro-Wilk tests of normality. Histograms were constructed for a visual assessment.

Exploring for missing data

Data was explored for missing values. Pie charts were constructed to display the percentage of missing variables, cases and values. Socio-demographic data, clinical characteristics and outcome measures of participants with missing values were compared to other participants (Osborne, 2012). Independent sample T-tests were used to compare the means between categorical and continuous variables. Chi-square and Fisher's exact test was used to compare means of categorical variables. Fisher's exact test was used to assess the differences when data violated the assumption concerning the 'minimum expected cell frequency' for chi-squared tests. Yates' correction for continuity, which compensates for the overestimating of the chi-square value when used with a 2 by 2 table, was used to determine the differences grouped by gender. Patterns to explain the missing data were explored.

Dealing with missing data

Multiple imputation technique, using automatic linear regression was used to generate randomly missing data (Osborne, 2012; Sterne et al., 2009). All outcome measures with the inclusion of age and sex were set as dependants or predictors for missing data based on their missingness mechanisms. Minimum and maximum scores for each scale were set. Five imputations were generated using the following constraints; minimum and maximum possible scores for each scale/ subscale, 50 case draws and 2 parameter draws (Carpenter and Kenward, 2008; Collins et al., 2001; Sterne et al., 2009).

Bivariate analyses

Correlation coefficients (Spearman's Rho for non-parametric data) were used to explore all bivariate correlations between the RMDQ and other outcome measures. They were calculated for original and data pooled from multiple imputation. Correlations were considered low if ≤0.30, moderate for 0.30-0.60 and high for ≥0.60 (Mâaroufi et al., 2007).

Analyses into the association between age (Spearman's Rho), gender (independent sample T-test and Mann-Whitney U) and all outcome measures were carried out to identify confounders. Confounders are factors are known to be associated with the outcome (RMDQ) but could differ against other outcome measures (Pallant, 2005). These analyses aimed to identify whether age or gender should be accounted for. Unaccounted for, confounders can affect associations.

Multiple linear regression

Linear regression was used to calculate a standardised beta coefficient to explain the variance in LBP disability. Variables demonstrating significant bivariate correlations with RMDQ were

entered in the regression analyses after accounting for age and gender (Model 1, two-step model). The contributions of the variables to the model were assessed for significance.

Considering the aim of this PhD thesis is to design a LBP management program to reduce LBP disability through the modification of psychosocial factors and not pain intensity, the relationship between pain intensity was accounted for in Models 2 and 3 (three-step models) with age and gender. This helped determine the contribution of the other psychosocial factors to LBP disability after accounting non-modifiable factors. These steps were carried out for original (Model 2) and data pooled from multiple imputation (Model 3), and then compared. The model was assessed for collinearity, tolerance levels, and goodness of fit. Normal probability plots and scatterplots of the standardised residual were assessed for normality.

4.4 Results

4.4.1 Pilot

Potential participants were followed; until the researcher gathered feedback from 10 subjects completing the questionnaire and 10 who have not. Table IV-1 describes the participation of patients who returned the questionnaires. Six of the 10 were females. Four of the 10 completed the questionnaire independently on site (at their respective physiotherapy department). Another one of the 10 completed it with the researcher reading it out loud because she was illiterate. Participations completing the questionnaire on site required 24-36 minutes, and 45 minutes for the illiterate patient. The five participants who took it home reported it took them 30-35 minutes. Participants' comments are in Table IV-1.

Table IV-1 Summary of first 10 participants to report completion of the questionnaires

	Sex	Location	Time	Comments
1	F	Home	Patient reports roughly 35 minutes	No comments
2	F	Home	Patient reports roughly 30 – 35 minutes	No comments
3	F	Home	Patient reports roughly 35 minutes	Found some of the questions interesting
4	F	On site	28 minutes	Found the questionnaire lengthy, particularly the CSQ
5	M	On site	33 minutes	No problems understanding the instructions He would have preferred if he knew more about the length of the questionnaire and font size to bring his reading glasses
6	F	Home	Patient reports roughly 30 minutes	All instructions and items were easy to understand Enjoyed participating in the study and meeting the research team
7	M	On site	24 minutes	The font size was too small
8	M	On site	26 minutes	No comments
9	M	On site	36 minutes	It was clear Some of the questions felt repetitive Would find it interesting to be filled out at the end of his allocated treatment sessions
10	F	On site with the researcher	45 minutes	Items were read verbatim to the participant, and she found them clear Enjoyed discussing her back pain with the researcher

F: female; M: males.

Table IV-2 describes the participation of 10 patients who withdrew their participation after recruitment. The sample was evenly split between males and females. Eight of the 10 withdrew on site. Four of the 10 reported time constraints. Three of the 10 felt the items in the questionnaires did not apply to them. Reasons from other participants are in Table IV-2.

Table IV-2 First 10 participants to report withdrawal from participation

	Sex	Location	Reason(s) for dropping out
1	F	On site	Illiterate
2	F	On site	The questionnaire looks too long
3	M	On site	Does not want to participate
4	M	On site	Does not have time
5	M	Took home	Does not have time to return the questionnaire He scheduled two appointments for therapy and to return the questionnaire and still has not had time
6	M	Took home	Reported dyslexia Questionnaire taken home to fill out, and later declined participation
7	M	On site	Does not have back pain so the questions did not apply to him He was curious to have a look at the questions
8	F	On site	Does not have that kind of low back pain and the questions do not apply to her
9	F	On site	Does not currently have low back pain currently The questionnaire stressed her, made her nauseous, and possibly caused her emotional distress just reading them Declined
10	F	On site	Too busy

F: female; M: males.

4.4.2 Initial data treatment

Participants' characteristics

Questionnaires from 199 participants were returned from all four sites. Mean age (SD) was 44.58 (13.41) years. Females represented 57.8% (n= 115); housewives made up 26.4% of the sample. Pain ranged from 3 months to more than 20 years, with 31.13% of the patients having had pain between 3 months to 1 year. Most participants reported their LBP was of gradual onset (24.2%), followed by carrying a heavy load (16.5%), and the possibility of multiple reasons contributing to their LBP (15.4%). For more information on participants' characteristics refer to Table IV-3.

Table IV-3 Participants' characteristics

Characteristics		n =	Percentage (%)
Age	Mean (SD)		
	44.58 (13.41)	193	
	Missing values	5	97.0
Gender	Female	115	57.8
Marital status	Single	23	12.6
	Married	142	78.0
	Separated	5	2.7
	Divorced	3	1.6
	Widowed	9	4.9
Education level	Elementary school	16	8.8
	Secondary school	57	31.3
	Graduate diploma	37	20.3
	Undergraduate education	33	18.1
	Postgraduate qualification (or equivalent)	17	9.3
	Doctoral qualification (or equivalent)	2	1.1
	No schooling	20	11.0
Work status	Banking and financial services	7	3.8
	Civil servants	15	8.2
	Engineering and construction	7	3.8
	Healthcare professional	6	3.3
	Housewife	48	26.4
	IT and computing services	3	1.6
	Manual labour	9	4.9
	Retired	22	12.1
	Self-employed and private business owners	6	3.3
	Student	5	2.7
	Teaching and education	21	11.5
	Unemployed	8	4.4
	Other	25	13.7

Characteristics		n =	Percentage (%)
Duration of low back pain	3 - 6 months	31	17.0
	7 months - 1 year	26	14.3
	2 years	22	12.1
	3 years	12	6.6
	4 - 5 years	30	16.5
	6 - 10 years	29	15.9
	11 - 15 years	17	9.3
	16 - 20 years	8	4.4
	20 years or more	7	3.8
Reason for low back pain	No reason, gradual onset	44	24.2
	Being overweight	2	1.1
	Car accident	6	3.3
	Carrying a heavy load	30	16.5
	Sports injury	6	3.2
	Work-related injury or accident	13	7.1
	Multiple reasons selected	28	15.4
	Not sure	19	10.4
	Other type of accident	14	7.7
	Other reason(s)	18	9.9
	Missing values	2	1.1

n: number of participants; SD: standard deviation.

Normality assessments

Kolmogorov-Smirnov and Shapiro-Wilk tests of normality showed that all outcome measures except BBQ, DA, IP, IBA, and FABQ-w were non-normally distributed. The main outcome measure; RMDQ was non-normally distributed therefore further data analysis was carried out using non-parametric tests. Results are in Table IV-4.

Table IV-4 Results of normality tests for outcome measures

	Kolmogorov–Smirnov¥	Shapiro-Wilk¥
RMDQ	0.09**	0.97**
VAS	0.08**	0.98**
BBQ	0.06	0.99
DA	0.06	0.99
RPS	0.12**	0.95**
CAT	0.08**	0.97**
IP	0.06	0.99
PH	0.08**	0.93**
CSS	0.07	0.97**
IBA	0.06	0.99
COP	0.27**	0.44**
ADP	0.22**	0.91**
FABQ-pa	0.11**	0.96**
FABQ-w	0.05	0.98
HADS-anx	0.09**	0.97**
HADS-dep	0.10**	0.97**

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; Sig: significance level; VAS: Visual Analouge Scale for pain intensity. * $p \leq 0.05$, ** $p \leq 0.01$, ¥Statistic has 178 degrees of freedom.

Exploring for missing data

Figure IV-1 shows a visual representation of missing data. Analysis of patterns for missing data shows 92 of the 98 items on the questionnaires had missing data (Figure IV-1, “Variables”). Complete casewise data came from 132 participants (Figure IV-1, “Cases”). Missing values represented 6.25% of the data Figure IV-1, “Values”).

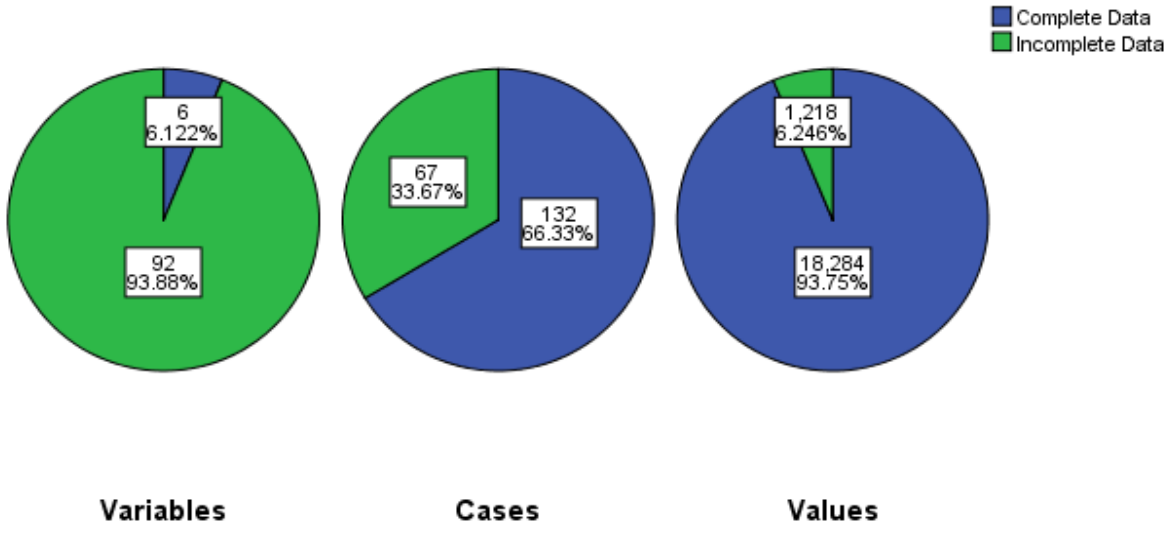

Figure IV-1 Summary of complete and incomplete data shown by variable, case and value alayses.

It was not possible to calculate the CSQ subscales for seventeen participants (8.5%), with the exception of their effectiveness scales. Seventeen participants had 82.4% or more of their CSQ values missing. The 17 participants had approximately ≥33% (32.7-90.8%) of possible values missing. Their mean age (SD) was 44.88 (10.39) years. Eight of them were females (52.9%). RMDQ mean (SD) 10.62 (6.00) (n= 13). There were no differences in any socio-demographic measures or other variables between these participants (n= 17) and the rest of the sample (n= 182). See Table IV-5.

Table IV-5 Characteristics of participants with ≥33% missing data and comparison to the rest of the sample

Characteristic		n =	Fisher's exact test
Age	Mean (SD)		
	44.88 (10.39)	17	t(df)= 0.11(196)^{NS}
Sex	Female	8	1.10$^{¥NS}$
Marital status	Single	1	1.11^{NS}
	Married	16	
Education level	Elementary school	3	3.55^{NS}
	Secondary school	4	
	Graduate diploma	3	
	Undergraduate education	2	
	Postgraduate qualification (or equivalent)	2	
	No schooling	3	
Work status	Healthcare professional	2	13.05^{NS}
	Housewife	4	
	Manual labour	2	
	Retired	1	
	Self-employed and private business owners	1	
	Student	1	
	Teaching and education	1	
	Unemployed	2	
Durations of low back pain (n= 15)	3 - 6 months	3	8.25^{NS}
	3 years	3	
	4 - 5 years	3	
	6 - 10 years	3	
	11 - 15 years	2	
	16 - 20 years	1	
Reason for low back pain	No reason, gradual onset	2	7.86^{NS}
	Carrying a heavy load	2	
	Work-related injury or accident	2	
	Multiple reasons selected	4	
	Not sure	4	
	Other reason(s)	3	

SD: standard deviation; t(df): T-test statistic (degrees of freedom); ¥Chi-squared test with Yates' correction for continuity; NS: not signficant p ≥ 0.05.

The RMDQ mean (SD) 10.62 (6.00) was available for 13 of the 17 participants. It was not possible to calculate meaningful descriptive statistics for CSQ subscales other than the effectiveness items. Means and standard deviations from available data is shown in Table IV-6. There were no differences in any outcome measures for participants with missing data (n= 17) compared to the rest of the sample (n= 182).

Table IV-6 Summary of outcome measures for participants with ≥33% missing data and comparison to rest of the sample

		n=	Mean	SD	t	df
Age	MD	17	44.88	10.39	0.11^{NS}	196
		181	44.51	13.63		
VAS	MD	12	5.1867	3.16	0.24^{NS}	192
		182	5.0167	2.36		
RMDQ	MD	13	10.62	6.01	0.29^{NS}	193
		182	10.20	4.86		
COP	MD	7	3.00	0.82	-1.12^{NS}	186
		181	3.60	1.33		
ADP	MD	5	2.80	0.84	-1.31^{NS}	184
		181	3.56	1.29		
FABQ-pa	MD	4	20.25	3.78	1.86^{NS}	184
		182	14.21	6.47		
FABQ-w	MD	4	26.00	12.25	0.84^{NS}	176
		174	21.57	10.36		
HADS-anx	MD	6	8.33	4.23	0.72^{NS}	182
		178	7.10	4.13		
HADS-dep	MD	7	6.14	3.53	0.03^{NS}	184
		179	6.10	3.56		

MD: participants with missing data; BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analouge Scale for pain intensity. t: T statistic; NS: not signficant $p \geq 0.05$; df: degrees of freedom

Imputation of missing data

All available data for the outcome measures from the 17 participants (Table IV-6) was retained in the data set to impute missing data for these patients and other missing data. Participants

had to have data for the RMDQ and at least 1 other outcome measure (n= 12). This meant 12 out of 17 participants could give pairwise data. Therefore 5 participants were completely removed from the analyses to adhere to the predetermined case and parameter draws outline in the constraints (see *Dealing with missing data* 4.3.4 4.3.4). The rest of the sample (n= 182) had 1.0% to 14.3% missing values from 50 other participants. And therefore was not possible to calculate certain scores for some subscales. This is shown in Table IV-7 which indicates the number of participants missing a subscale score from the total sample (n= 199). The table also shows which variables were set as dependants and predictors for the missing data based on their missingness mechanism.

Table IV-7 Dependant and predictor variables and predefined constraints for multiple imputation

Variable	Missing n =	Dependant	Predictor	Minimum	Maximum
Age	1	Yes	Yes	18	None
Sex	0	No	Yes	N/A	
VAS	0	No	Yes	N/A	
RMDQ	0	No	Yes	N/A	
BBQ	4	Yes	Yes	9	45
DA	18	Yes	Yes	0	36
RPS	23	Yes	Yes	0	36
CAT	19	Yes	Yes	0	36
IPS	24	Yes	Yes	0	36
PH	20	Yes	Yes	0	36
CSS	21	Yes	Yes	0	36
IBA	19	Yes	Yes	0	36
COP	6	Yes	Yes	0	3
ADP	8	Yes	Yes	0	3
FABQ-pa	8	No	Yes	N/A	
FABQ-w	16	Yes	Yes	0	42
HADS-anx	8	Yes	Yes	0	21
HADS-dep	10	Yes	Yes	0	21

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

Mean (SD) of the original and imputed data (referred to as the pooled mean) are shown in Table IV-8 along with the number of valid and missing values. RMDQ and VAS mean (SD) and pooled means were 10.18 (4.76) and 5.03 (2.40), respectively, due to no missing data. Age mean (SD) and pooled means were 44.58 (13.41) due to one missing value. Table IV-8 contains a summary of all means and standard deviations.

Table IV-8 Means and pooled means of outcome measures after multiple imputation

	Mean (SD)	Pooled Mean
Age	44.58 (13.41)	44.58
VAS	5.03 (2.40)	5.03
RMDQ	10.18 (4.76)	10.18
BBQ	25.16 (6.10)	25.10
DA	16.84 (8.02)	16.96
RPS	11.30 (8.20)	11.65
CAT	12.18 (7.50)	12.49
IPS	17.49 (8.69)	17.50
PH	26.11 (6.65)	25.94
CSS	22.80 (8.40)	22.62
IBA	19.10 (8.28)	18.98
COP	3.58 (1.32)	3.54
ADP	3.54 (1.29)	3.48
FABQ-pa	14.34 (6.48)	14.42
FABQ-w	21.67 (10.39)	21.79
HADS-anx	7.14 (4.13)	7.18
HADS-dep	6.10 (3.55)	6.17

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

4.4.1 Bivariate analyses

Associations between RMDQ and co-variates

Associations between the RMDQ and co-variates (VAS, BBQ, DA, RPS, CAT, IP, PH, CSS, IBA, COP, ADP, FABQ-pa, FABQ-w, HADS-anx, and HADS-dep) from the original data and imputed data were calculated using Spearman's Rho for non-parametric correlations. RMDQ had moderate significant correlations ($p < 0.01$) with HADS-dep ($r = 0.38$), FABQ-pa ($r = 0.34$), VAS ($r = 0.33$), and BBQ ($r = -0.32$). RMDQ had low significant correlations ($p < 0.01$) with FABQ-w ($r = -0.29$), COP ($r = -0.27$), HADS-anx ($r = 0.26$), IP ($r= -0.26$) and ADP ($r= -0.20$). There were moderate significant correlations between COP and ADP with HADS-anx ($r = -0.44$, $r = -0.43$) and HADS-dep ($r = -0.48$, -0.44). Some subscales showed moderate correlations to subscales from the same questionnaire (Table IV-9). There were two significantly high correlations between CSQ subscales; IP and CSS ($r = 0.68$) and COP and ADP ($r = 0.62$). A summary of all associations are in Table IV-9.

With regards to results from pooled data following multiple imputation; the RMDQ had moderate significant correlations ($p < 0.01$) with the same outcomes as the original data: HADS-dep ($r = 0.39$), FABQ-pa ($r = 0.33$), VAS ($r = 0.33$), and BBQ ($r = -0.33$). Furthermore, the RMDQ had low significant correlations ($p < 0.01$) with the same outcomes as the original data: FABQ-w ($r = -0.29$), COP ($r = -0.27$), HADS-anx ($r = 0.26$), IP ($r = -0.28$) and ADP ($r = -0.20$). The moderate significant correlations between COP and ADP with HADS-anx ($r = -0.41$, $r = -0.43$) and HADS-dep ($r = -0.47$, -0.44) were also found. The high correlations were also observed between CSQ subscales; IP and CSS ($r = 0.65$) and COP and ADP ($r = 0.65$). A complete summary is found in Table IV-10.

Table IV-9 Correlation coefficients between all outcome measures

	RMDQ	VAS	BBQ	DA	RPS	CAT	IP	PH	CSS	IBA	COP	ADP	FABQ-pa	FABQ-w	HADS-anx
VAS	0.33**														
	194														
BBQ	-0.32**	-0.19*													
	190	190													
DA	0.08	0.14	0.07												
	176	176	175												
RPS	-0.15*	0.05	0.19*	0.50**											
	171	171	170	166											
CAT	0.17*	0.06	-0.27**	0.06	0.15*										
	175	175	173	169	165										
IP	-0.26**	-0.06	0.10	0.36**	0.46**	-0.22**									
	170	170	170	168	164	163									
PH	0.18*	-0.03	-0.07	0.23**	0.02	0.04	0.25**								
	174	174	173	170	165	167	165								
CSS	-0.129	-0.041	0.137	0.51**	0.54**	-0.10	0.67**	0.23**							
	173	173	172	168	164	168	164	167							
IBA	-0.07	-0.02	0.08	0.50**	0.46**	0.042	0.55**	0.35**	0.58**						
	175	175	173	170	166	169	165	169	166						

	RMDQ	VAS	BBQ	DA	RPS	CAT	IP	PH	CSS	IBA	COP	ADP	FABQ-pa	FABQ-w	HADS-anx
COP	-0.27**	-0.21**	0.14	0.11	0.19*	-0.25**	0.41**	0.15*	0.35**	0.36**					
	188	188	184	175	170	174	169	173	172	174					
ADP	-0.20**	-0.23**	0.14	0.11	0.11	-0.22**	0.42**	0.22**	0.33**	0.25**	0.62**				
	186	186	184	175	170	174	169	173	172	174	186				
FABQ-pa	0.34**	0.10	-0.28**	0.04	-0.13	0.20**	-0.32**	-0.03	-0.11	-0.16*	-0.32**	-0.27**			
	186	186	184	176	171	175	170	174	173	175	185	185			
FABQ-w	0.29**	0.11	-0.31**	-0.02	-0.08	0.26**	-0.13	0.03	-0.10	-0.08	-0.23**	-0.13	0.46**		
	178	178	177	171	165	167	164	168	166	168	177	177	178		
HADS-anx	0.26**	0.18*	-0.20**	0.05	-0.00	0.52**	-0.28**	-0.11	-0.14	-0.12	-0.44**	-0.43**	0.20**	0.22**	
	184	184	181	173	167	171	167	170	169	171	182	181	181	174	
HADS-dep	0.38**	0.25**	-0.31**	-0.02	-0.05	0.33**	-0.29**	-0.13	-0.25**	-0.26**	-0.48**	-0.44**	0.23**	0.33**	0.60**
	186	186	183	173	168	172	167	171	170	172	183	182	182	175	182

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. * P <0.05, ** p <0.01.

Table IV-10 Correlation coefficients between RMDQ and other outcome measures following multiple imputation

	RMDQ	VAS	BBQ	DA	RPS	CAT	IP	PH	CSS	IBA	COP	ADP	FABQ-pa	FABQ-w	HADS-anx
VAS	0.33**														
BBQ	-0.33**	-0.20**													
DA	0.06	0.14	0.08												
RPS	-0.12	0.07	0.20**	0.50**											
CAT	0.18*	0.09	-0.27**	0.08	0.18*										
IP	-0.26**	-0.07	0.11	0.36**	0.47**	-0.17*									
PH	0.15*	-0.04	-0.08	0.21**	0.01	0.03	0.24**								
CSS	-0.13	-0.05	0.14	0.48**	0.53**	-0.09	0.65**	0.23**							
IBA	-0.07	-0.03	0.09	0.48**	0.45**	0.07	0.55**	0.36**	0.57**						
COP	-0.27**	-0.19**	0.14	0.11	0.17*	-0.25**	0.40**	0.16*	0.35**	0.36**					
ADP	-0.20**	-0.21**	0.13	0.10	0.10	-0.21**	0.40**	0.22**	0.33**	0.27**	0.65**				
FABQ-pa	0.33**	0.10	-0.26**	0.05	-0.13	0.21**	-0.31**	-0.03	-0.13	-0.16*	-0.30**	-0.26**			
FABQ-w	0.29**	0.13	-0.32**	-0.02	-0.07	0.27**	-0.12	0.00	-0.10	-0.10	-0.24**	-0.14	0.46**		
HADS-anx	0.26**	0.20*	-0.21**	0.06	0.01	0.53**	-0.26**	-0.11	-0.15*	-0.09	-0.41**	-0.43**	0.19*	0.23**	
HADS-dep	0.39**	0.26**	-0.34**	-0.03	-0.04	0.36**	-0.29**	-0.16*	-0.26**	-0.26**	-0.47**	-0.44**	0.26**	0.33**	0.60**

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. * P <0.05, ** p <0.01.

Association with age

The RMDQ and other outcomes were explored for an association with age to determine whether it was a possible confounder (Table IV-11). Age had a significantly low association ($p < 0.01$) with RMDQ ($r = 0.26$). Age also had a significantly low inverse relationship ($p < 0.01$) with BBQ ($r = -0.22$ for original and $r = -0.21$ for pooled data) and RPS ($r = -0.20$ for both data sets). Age only had a significant moderate relationship ($p < 0.01$) with PH ($r = 0.36$).

Table IV-11 Correlation coefficients between age and other outcome measures

		Original data	Pooled data
RMDQ		0.26**	0.26**
	n=	193	194
VAS		0.07	0.08
	n=	193	194
BBQ		-0.22**	-0.21**
	n=	189	194
DA		-0.00	-0.01
	n=	175	194
RPS		-0.20**	-0.20**
	n=	171	194
CAT		0.01	0.02
	n=	174	194
IP		0.01	0.01
	n=	169	194
PH		0.36**	0.36**
	n=	173	194
CSS		-0.10	-0.10
	n=	172	194
IBA		-0.02	-0.03
	n=	174	194
COP		0.00	0.01
	n=	187	194
ADP		0.11	0.11
	n=	185	194
FABQ-pa		0.07	0.06
	n=	185	194

		Original data	Pooled data
FABQ-w		0.06	0.05
	n=	178	194
HADS-anx		-0.08	-0.09
	n=	183	194
HADS-dep		0.07	0.05
	n=	185	194

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. n: number of participants, * $P < 0.05$, ** $P < 0.001$.

Association with gender

All outcome measures were explored for an association with gender to determine whether it was a possible confounder (Table IV-12). Results show the distribution of all outcomes except COP, HADS-anx and HADS-dep ($p < 0.01$) were the same across both gender categories (male and female).

Table IV-12 Associations between gender and outcome measures

Outcome measure	Z value
RMDQ	-1.69
VAS	-1.89
BBQ	-0.08
DA	-1.12
RPS	-1.27
CAT	-1.72
IP	-0.06
PH	-0.45
CSS	-0.39
IBA	-1.26
COP	-2.47*
ADP	-1.82
FABQ-pa	-0.96
FABQ-w	-1.65
HADS-anx	-4.01**
HADS-dep	-2.69**

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. Z: Z value of Mann-Whitney U test, * $p \leq 0.05$, ** $p \leq 0.01$.

4.4.2 Accounting for variance in LBP disability

Model 1: Two-step model

The first model as was constructed after accounting for age and gender. The variables demonstrating significant correlations with RMDQ (BBQ, IP, COP. ADP, FABQ-pa, FABQ-w, HADS-anx, and HADS-dep) were entered in the regression analyses after accounting for age and gender. The two-step model is illustrated in Figure IV-2.

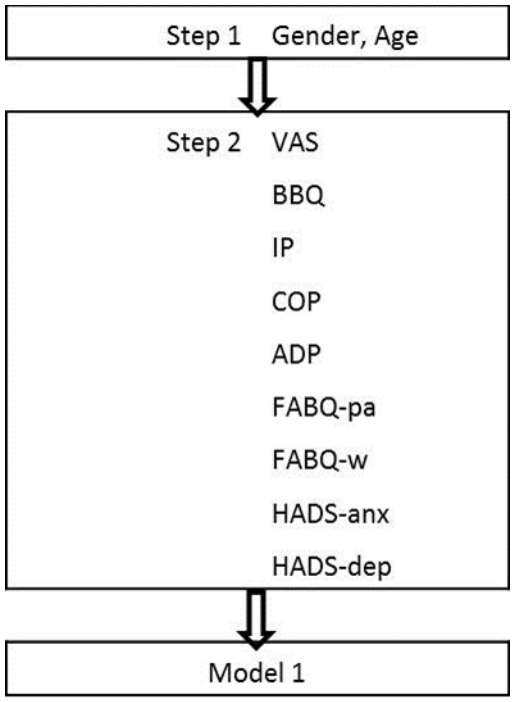

Figure IV-2 Model 1: Two-step model accounting for gender and age.

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: IP: Ignoring Pain Sensations; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

Model 1 shows the variance in RMDQ after accounting for age and gender. Age and gender accounted for 12.1% of the variance in RMDQ. After accounting for this, the other predictors (VAS, BBQ, IP, COP, ADP, FABQ-pa, FABQ-w, HADS-anx, and HADS-dep) accounted for a further 22.6% in RMDQ. Together, they account for 34.7% of the variance in RMDQ. Multiple imputation data show slightly higher values (Table IV-13). For example; the fifth imputation shows age and gender accounted for only 8.3% of the variance in RMDQ, and VAS, BBQ, IP, COP, ADP, FABQ-pa, FABQ-w, HADS-anx, and HADS-dep accounted for a further 28.5% (explaining a total of 35.8% of the variance in RMDQ).

Table IV-13 Model 1: Multiple linear regression with LBP disability as the dependant variable

Data set	Step	Standardised Beta	R Square	Change Statistics	
				R Square Change	F Change
Original data	Age	0.25			
	Gender	0.08	0.121	0.121	10.75**
	BBQ	-0.07			
	VAS	0.19			
	IP	-0.09			
	FABQ-pa	0.18			
	FABQ-w	0.08			
	HADS-anx	0.06			
	HADS-dep	0.17			
	COP	0.05			
	ADP	-0.01	0.347	0.226	5.65**
5th imputation	Age	0.19			8.60
	Gender	0.04	0.083	0.083	9.12
	BBQ	-0.13			
	VAS	0.22			
	IP	-0.14			
	FABQ-pa	0.10			
	FABQ-w	0.11			
	HADS-anx	0.05			
	HADS-dep	0.19			
	COP	0.02			
	ADP	0.01	0.368	0.285	

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: IP: Ignoring Pain Sensations; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. F: F statistic; R: Regression coefficient; * $p < 0.05$, ** $p < 0.01$.

To further investigate the independent contribution of the different predictors to the model, the unstandardized coefficients of each variable in the above model was investigated (Table IV-14). Both models show that VAS contributed significantly to the model ($p \leq 0.01$ for original and pooled data). The analysis of the original data showed that only FABQ-pa significantly ($p = 0.03$) contributed to the model after accounting for age and gender. However, the pooled data from the five imputations show that HADS-dep and IP both significantly ($p=0.02, 0.03$) contributed to the model after accounting for age and gender.

Table IV-14 Unstandardized Beta coefficients for Model 1

Data set	Stage	Variable	Unstandardized Beta	SE	Sig
Original data	1	(Constant)	4.48	1.26	**
		Age	0.10	0.03	**
		Gender	1.55	0.72	*
	2	(Constant)	1.71	3.11	
		Age	0.08	0.02	**
		Gender	0.72	0.68	
		BBQ	-0.05	0.06	
		VAS	0.36	0.13	**
		IP	-0.05	0.04	
		FABQ-pa	0.12	0.06	*
		FABQ-w	0.03	0.04	
		HADS-anx	0.07	0.10	
		HADS-dep	0.21	0.12	
		COP	0.15	0.33	
		ADP	-0.05	0.33	.
Pooled data	1	(Constant)	5.33	1.22	**
		Age	0.09	0.03	**
		Gender	1.24	0.68	

Data set	Stage	Variable	Unstandardized Beta	SE	Sig
Pooled data	2	(Constant)	4.47	2.86	
		Age	0.07	0.02	**
		Gender	0.40	0.61	
		BBQ	-0.10	0.05	
		VAS	0.43	0.13	**
		IP	-0.09	0.04	**
		FABQ-pa	0.08	0.05	
		FABQ-w	0.04	0.04	
		HADS-anx	0.04	0.10	
		HADS-dep	0.26	0.11	*
		COP	0.10	0.29	
		ADP	0.03	0.31	

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: IP: Ignoring Pain Sensations; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. SE: Standard error; Sig: Significance level.

Model 2: Three-step model using original data

The model was re-built to account for contribution of FABQ-pa following gender, age and VAS. The variables demonstrating significant correlations with RMDQ were entered in the 3rd step (BBQ, IP, COP, ADP, FABQ-w, HADS-anx, and HADS-dep). The three-step model is illustrated in Figure IV-3.

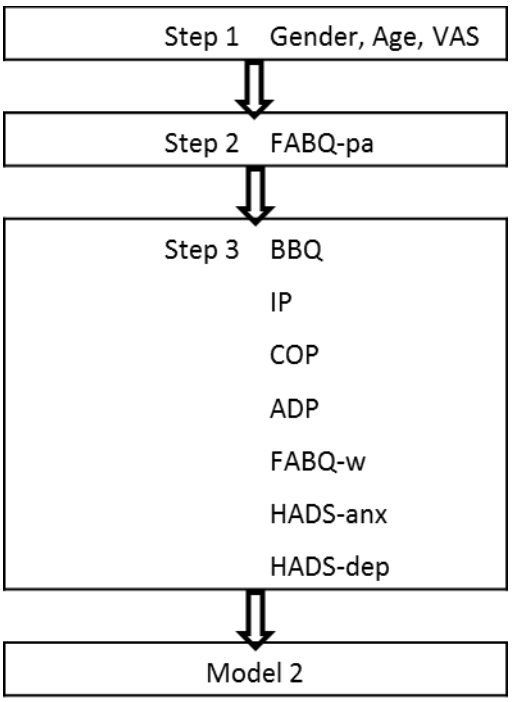

Figure IV-3 Model 2: Three-step model accounting for FABQ-pa following gender, age and pain intensity.

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: IP: Ignoring Pain Sensations; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

Model 2 (Table IV-15) shows FABQ-pa accounted for 8.9% of the variance in RMDQ after accounting for gender, age and VAS (18.6%). BBQ, IP, COP, ADP, FABQ-w, HADS-anx, and HADS-dep accounted for a further 7.2% in RMDQ. Together, they all account for 34.7% of the variance in RMDQ.

Modelling the values from the fifth imputation (Table IV-15) that BBQ, IP, COP, ADP, FABQ-w, HADS-anx, and HADS-dep accounted for a larger variance in RMDQ (11.5%), after FABQ-pa accounts for 7.0% and VAS, age and gender18.2%.

Table IV-15 Model 2: Multiple linear regression showing the unique contribution of FABQ-pa to LBP disability as the dependant variable

Data set	Step	Standardised Beta	R Square	Change Statistics	
				R Square Change	F Change
Original data	Age	0.08			
	Female	0.72			
	VAS	0.36	0.186	0.186	11.79**
	FABQ-pa	0.12	0.275	0.089	18.88**
	BBQ	-0.05			
	IP	-0.05			
	FABQ-w	0.03			
	HADS-dep	0.21			
	HADS-anx	0.07			
	COP	0.15			
	ADP	-0.05	0.347	0.072	2.33*
5th imputation	Age	0.07			
	Female	0.51			
	VAS	0.36	0.182	0.182	11.35**
	FABQ-pa	0.09	0.252	0.070	15.87**
	BBQ	-0.07			
	IP	-0.073			
	FABQ-w	0.03			
	HADS-dep	0.29			
	HADS-anx	0.06			
	COP	0.07			
	ADP	0.07	0.368	0.115	4.02**

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: IP: Ignoring Pain Sensations; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. F: F statistic; R: Regression coefficient; * $p < 0.05$, ** $p < 0.01$.

Model 3: Three-step model using pooled data

The model was re-built to account for contribution of HADS-dep and IP due to their significant contribution suggested by Model 1 (Table IV-14). The model tested the contribution of HADS-dep and IP after accounting for gender, age and VAS (1st step). The variables demonstrating significant correlations with RMDQ were entered in the 3rd step (BBQ, COP. ADP, FABQ-pa, FABQ-w, and HADS-anx). The three-step model using pooled data is illustrated in Figure IV-4.

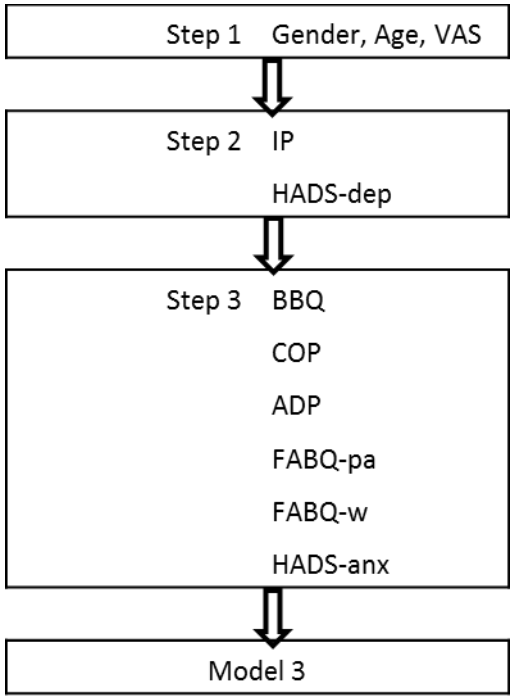

Figure IV-4 Model 3: Three-step model accounting for IP and HADS-dep following gender, age and pain intensity.

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: IP: Ignoring Pain Sensations; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

Model 3 (Table IV-16) shows HADS-dep and IP accounted for 10.6% of the variance in RMDQ after accounting for gender, age and VAS (18.6%). BBQ, COP, ADP, FABQ-pa, FABQ-w, and HADS-anx, accounted for a further 5.5% in RMDQ. Together, they all account for 34.7% of the variance in RMDQ.

Modelling the values from the fifth imputation (Table IV-16) shows BBQ, IP, COP, ADP, FABQ-w, HADS-anx, and HADS-dep accounted for the same variance in RMDQ (5.5%), after HADS-dep and IP accounted for 13.0% of the variance and VAS, age and gender18.2%. Together they explained 36.7% of the variance in RMDQ.

Table IV-16 Model 3: Multiple linear regression showing the unique contribution of IP and HADS-dep to LBP disability as the dependant variable

Data set	Step	Standardised Beta	R Square	Change Statistics	
				R Square Change	F Change
Original data	Age	0.08			
	Female	0.72			
	VAS	0.36	0.186	0.186	11.79**
	HADS-dep	0.21			
	IP	-0.05	0.292	0.106	11.46**
	BBQ	-0.05			
	COP	0.15			
	ADP	-0.05			
	FABQ-pa	0.12			
	FABQ-w	0.03			
	HADS-anx	0.07	0.347	0.055	2.07 (p= 0.06)
5th imputation	Age	0.07			
	Female	0.51			
	VAS	0.36	0.182	0.182	14.13**
	HADS-dep	0.09			
	IP	-0.07	0.313	0.130	17.82**
	BBQ	-0.07			
	COP	0.03			
	ADP	0.30			
	FABQ-pa	0.06			
	FABQ-w	0.07			
	HADS-anx	0.07	0.368	0.055	2.64*

BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: IP: Ignoring Pain Sensations; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity. F: F statistic; R: Regression coefficient; * $p < 0.05$, ** $p < 0.01$.

Further considerations

The predictor variables used in each of the regression analyses had Variance Inflation Factors that were higher than 0.2 and considerably less than 10 indicating that the data were not affected by multicollinearity (Pallant, 2005). Inspection of the scatterplots of the standardised residuals for Models 1-3 show that the residuals are roughly rectangularly distributed, with most of the scores concentrated in the centre along the 0 point (Field, 2013). Less than 5% of cases had standardised residuals above 2 indicating that the models were an accurate reflection of the actual data (Tabachnick and Fidell, 2013). Inspection of normal probability plots for residuals of Models 1-3 do not show deviations from normality. Therefore, it is assumed that the variance around the regression line is the same for all values of the predictor variables, indicating homoscedasticity (Field, 2013).

4.5 Discussion

4.5.1 Summary of findings

This study showed that LBP disability in Bahraini patients is moderately associated with depression, fear-avoidance beliefs about physical activity, pain intensity and back pain-related beliefs. There were low associations with fear-avoidance beliefs about work, anxiety, ability to ignore pain and ability to decrease pain. After accounting for age, gender and pain intensity, fear-avoidance beliefs about physical activity accounted for 8.9% and 7% of the variance in the original and imputed data. The contribution of depression and the ability to ignore pain was also examined after accounting for the same variables, and they jointly accounted for 10.6% and 13.0% of the variance in the original and imputed data respectively. Altogether, age, gender, pain intensity, back pain-related beliefs, both fear-avoidance beliefs subscale, ability to ignore, control and decrease pain, depression and anxiety explained 34.7% of the variance in LBP disability.

4.5.2 Participants

The study included data from 199 participants with 18 years or older with back pain, with or without leg symptoms lasting for more than three months. Participants were excluded in the presence of a diagnosis of inflammatory disease, spinal fractures or recent surgery (less than 1 year ago), or pregnancy. (See 4.3.2 4.3.2for a complete description of inclusion and exclusion criteria). The inclusion and exclusion criteria allow the researcher to compare the results to other *chronic* LBP patient populations, meaning patients' with LBP for longer than three months. The exclusion of patients with the aforementioned medical history portrays results from patients with *non-specific LBP* (see section 1.1.2). Participants with specific inflammatory

or other diagnoses are usually not be eligible for a PMP because they are expected to have different beliefs and expectations based on their diagnosis and medical management (Sloan et al., 2008). Another important feature of this patient sample is that they are recruited from physiotherapy departments; and are therefore "care-seeking patients". Again, patients seeking care for LBP are expected to have different beliefs and other psychosocial factors compared to individuals with pain in the general public (Baird and Haslam, 2013; Buchbinder et al., 2001b; Chew-Graham and May, 1999). Although this criterion makes the results of this study limited to care-seeking patients, specifically targeting patients seeking care for LBP can be considered a strength of this study. This allows for the comparison of samples in Western studies, and to generalise findings to other patients seeking care for LBP. It is also noted that the inclusion criteria was not restricted to recruiting participants with clinically significant psychosocial factors, similarly to other cross-sectional explorations (see Chapter 1, section 1.4). Retrospective analysis has shown that 52.1%, 23.2%, 36.6% and 28.4% of participants had clinically significant FABQ-pa, FABQ-w, HADS-anx and HADS-dep respectively according to values found in the literature (Burton et al., 1999; Fritz and George, 2002; Zigmond and Snaith, 1986). Although no clinically significant values or change are available for the CSQ, results of the CSQ subscales were within reported values in the Western literature (Woby et al., 2004; Woby et al., 2005, Tan et al., 2001). This was done for several reasons; the PhD study aimed to generalise findings to all patients with non-specific LBP for greater than three months seeking care at this point; further analysis could carried out for future studies. Secondly, previous to this study there was no evidence on cross-sectionally associated variables or predictors of LBP disability in Bahrain. Therefore, limiting the inclusion criteria could have biased findings. And lastly, it cannot be assumed that clinically significant cut-off points available in Western literature are also valid for non-Western populations.

4.5.3 Implications for missing data

Only 8.5% (n= 17) of participants had a third or more of their data missing from the returned questionnaires and no differences were found in their clinical characteristics or outcome measures, indicating that data is missing at random or completely at random. The multiple imputation method is valid on the assumption that data is missing completely at random or missing at random. Closer inspection of the missingness mechanism showed it was not possible to calculate CSQ subscales for 17 participants. This could possibly deem the data missing not at random because participants did not complete the CSQ. This could be due to its length, time constraints, lack of understanding of the items, or perhaps disinterest in the scale. It is important to note that 132 patients had complete listwise data, satisfying the minimum sample size of 132 participants. The results following multiple imputations are similar to those

with the original data., with the exception of the significance of the contribution the outcome measures had to the model after taking age, gender, and VAS into account. This could be because there were more missing values for IP and HADS-dep combined versus FABQ-pa. It is important to acknowledge these issues when interpreting the data.

4.5.4 Pain Intensity

The study found a positive moderate association between LBP disability and pain intensity ($r=0.33$, $p\leq0.05$). The association between LBP disability and pain intensity is similar in Middle Eastern countries (Bejia et al., 2005; Mâaroufi et al., 2007; Mousavi et al., 2006), Hong Kong (Chan and Chiu, 2008), Colombia (Payares et al., 2011) and Western countries (Turner et al., 2006; Van Der Hulst et al., 2005). Similar results have been found in non-Western populations for other chronic pain conditions (Asghari, 2011; Thumboo et al., 2002). Some non-Western countries such as Brazil (Nusbaum et al., 2001) and Korea (Lee et al., 2011; Moon et al., 2011) showed high correlations between pain and LBP disability, indicating that in some cultures the relationship between pain and intensity and LBP disability is moderate and high in others. This shows that LBP pain is expressed differently by different cultures (Maki et al., 2014b). In the case of the latter countries exhibiting high correlations; LBP pain was more likely to be reported with expressions that indicate physical disability. On the other hand, those studies report findings from translation and cross-cultural adaptation process. Higher associations between LBP disability and pain intensity could indicate better psychometric properties and subject the studies to a publication bias.

4.5.5 Age and Gender

Older age was associated with disability. However, older age showed participants were less likely to have negative back beliefs and reinterpret pain sensations ($r < 0.30$, $p \leq 0.05$). The use of praying and hoping as a coping strategy also increased with age ($r \geq 0.30$, $p \leq 0.05$). Another study in the Gulf Region showed younger workers exhibited higher fear-avoidance beliefs (Al-Obaidi et al., 2005), see 1.3.1. Other studies have found no association between age and gender to LBP disability (Cai et al., 2007; Van Der Hulst et al., 2005). Differences in behaviours according to age could be culturally specific; especially praying and hoping. Religiosity has been seen to increase with age in the Gulf Region (Campbell, 2015).

Female gender was more associated with anxiety and depression. Another study from the Gulf Region reported that symptoms of depression in LBP female patients were more prevalent compared to males (Bener et al., 2013). Findings from this study showed that women were less likely to control their pain. This is supported by other studies showing that women in the Gulf

Region were more likely to report LBP interfering with activities of daily living (Bener et al., 2003; Bener et al., 2004), see 1.3.2.

4.5.6 Fear-avoidance beliefs

There were significant correlations between LBP disability and fear-avoidance behaviours with regards to physical activity (moderate, r =0.34) and fear-avoidance behaviours to work (low, r =0.29). Low to moderate associations between LBP disability and fear-avoidance beliefs have been found by several studies (Chan and Chiu, 2008; Crombez et al., 1999; Korkmaz et al., 2009; Laufer et al., 2012) and in the previous systematic review (Chapter 2; Maki et al., 2015). However most studies tended to report stronger associations between FABQ-w to LBP disability compared to FABQ-pa to LBP disability. This could be because the housewives made up approximately a quarter of this study's sample (26.4%) and together with students, retired and unemployed patients they all accounted for over a third of the sample. The proportion of patients not undertaking paid work could have affected the results of the FABQ-w subscale, resulting in a low correlation. On the other hand, studies in Spain found that FABs had low to no association with LBP in adults (Kovacs et al., 2005) and elderly populations (Kovacs et al., 2007). The authors' attributed this difference in beliefs to cultural factors.

4.5.7 Catastrophizing

The catastrophizing subscale of the CSQ had a low correlation to disability ($r = 0.17$, $p < 0.05$). Others have found moderate relationships between catastrophizing and disability (Kovacs et al., 2011; Linton, 2000; Peters et al., 2005; Wertli et al., 2014b) and as predictor of negative outcome in the short and long-term (Burton et al., 1995; Picavet et al., 2002; Wertli et al., 2014a). Sloan et al., (2008) found that female gender, higher levels of psychological distress and negative pain beliefs were associated to catastrophizing. Although the findings of this current study showed a significant moderate correlation for LBP disability and both anxiety and depression, it showed no association with the female gender and a low correlation with back-pain beliefs and fear-avoidance belief. A moderate to high correlation would have been expected between negative pain beliefs, particularly with FABs, based on the theoretical underpinnings of the development of FABs and fear of (re)injury (Leeuw et al., 2007a). Spanish studies (Kovacs et al., 2007; Kovacs et al., 2005) have found the opposite; FABs were not significantly related to LBP disability but catastrophizing was (Kovacs et al., 2011). This could mean that in some cultures like Bahrain, fear-avoidance beliefs and behaviours are reported however catastrophizing might not represent LBP disability levels.

Recent reviews (Wertli et al., 2014a) found that although there is a theoretical relationship between both factors and disability, there is a lack of literature exploring relationship between FABs and catastrophizing. This warrants an investigation into reasons why those subscales are not as related as expected. Perhaps it is due to different health beliefs; catastrophic phrases and / or fear-avoidant attitudes might be normal cultural responses to pain rather than an indicator of higher levels of disability.

4.5.8 Coping strategies

LBP disability did not correlate highly with any of the CSQ subscales. This could mean that none of the coping strategies described in the questionnaire reflected Bahraini patients' experiences, see 4.5.2. There was a low correlation between the RMDQ and IP ($r = -0.26$, $p < 0.01$). Previous studies have found low and occasionally non-significant relationships between measures of perceived LBP disability and IP (Cano et al., 2006; Main and Waddell, 1991; Tan et al., 2001). In this current study participants who were able to ignore their pain also seemed to have lower fear-avoidance beliefs about physical activity. This study also found low correlations between LBP disability with ability to control and decrease pain, whilst other studies found no relationships.

The current study found praying and hoping correlated weakly to LBP disability. PH has been found to be predictive of negative LBP outcome in acute and chronic LBP patients (Burton et al., 1995). Other studies have found a moderate relationship with LBP disability in African Americans (Cano et al., 2006) and British patients (Main and Waddell, 1991). This finding is interesting in a culture that is heavily influenced by religion; one would have expected it to have an inverse relationship with disability. Descriptive statistics show that the PH subscale scored the highest out of all the CSQ subscales indicating that it was a common coping strategy irrespective of RMDQ score. Patients used praying and hoping to cope regardless of their perceived disability level. PH scores were associated with age, indicating that older participants with LBP are more likely to use this as a coping strategy. The CSQ factor structure (section 3.4.2) showed that the PH subscale has been dropped post-analysis. Further investigation with the suggested four-factor structure could show a more meaningful relationship between CSQ subscales and LBP disability.

4.5.9 Anxiety and Depression

Results from this study are similar to previous findings in other which show an association between symptoms of psychological distress such as depression and negative LBP outcomes (Aceves-González and Prado-Leon, 2008; Carroll et al., 2004; Croft et al., 1995; Pincus et al., 2002). Symptoms of depression, anxiety and distress are expected to play a role in chronic

disability because of the theorized cyclical relationship where persistent pain is seen to produce distress, which promotes inactivity and disability, which in turn have an impact on perceived pain, further distress and disability (Bath and Grona, 2015; Snelgrove and Liossi, 2013). Findings from this study show a significant moderate association between depression and anxiety with catastrophizing consistent to other studies (Keefe et al., 2004; Keefe and Williams, 1990; Main and Waddell, 1991; Tan et al., 2001). The study also found participants with higher levels of depression were more likely to have negative back-pain beliefs and fear-avoidance beliefs at work, and participants were more likely to feel anxious or depressed as they reported less effectiveness in controlling and decreasing their pain.

The use of the HADS was a pragmatic choice considering it distinguished symptoms of anxiety and depression from somatic disorders (Snaith, 2003; Zigmond and Snaith, 1986) and demonstrated good psychometric properties with Arabic-speaking patients (El-Rufaie and Absood, 1995; El-Rufaie and Absood, 1987). Although the intention of the this study was not to validate the HADS with Arabic-speaking LBP patients, the results were similar to previous findings and theoretical relationships encouraging further use with LBP patients.

4.5.10 Explaining the variance in LBP disability

This study was able to explain 34.7% of the variance in LBP disability. Age and gender accounted for 12.1% of the model, and then 18.6% following the account for pain intensity. Model 2 showed that FABQ-pa accounted for a further 8.9%, and model 3 showed that HADS-dep and IP accounted for 10.6% of the variance. Another study (Mannion et al., 2001) found that coping strategies, psychological distress, efficacy (measured by the CSQ), FABs and pain intensity explained a similar variance of 37.5% of LBP disability. However, when items were entered simultaneously, this study found pain intensity contributed 19.1%, psychological distress 12.8%, and FABs 10% to the variance. There is some controversy in the literature concerning the relation between pain intensity and disability in LBP as previously discussed. Studies, similar to this one, have found only a modest – however significant, contribution of pain intensity to the variance in LBP (Vlaeyen et al., 1995b; Waddell et al., 1993; Waddell et al., 1992). However, other studies have reported large percentages of the variance in disability to pain intensity, with percentages higher than 10% (Mannion et al., 2001; Peters et al., 2005; van den Hout et al., 2001; Woby et al., 2004). Regardless of the degree of association between pain intensity and LBP disability, studies demonstrate that pain-related fear (Mannion et al., 2001; Peters et al., 2005; Pfingsten et al., 2000; Woby et al., 2004) and symptoms of depression, anxiety and distress (Glombiewski et al., 2010; Mannion et al., 2001) explain the additional variance and are important predictors of disability.

4.5.11 Limitations

Only age and gender were taken into consideration amongst other potential social factors; such as educational level and work status (see2.5.7). Assessing for relationships with more factors might weaken the strength of the model, and a larger sample size would be required.

Outcome measures, such as the CSQ, were chosen based on their prevalent use in Western literature and may not be entirely appropriate in this population. Therefore, further explorations with Arabian Gulf LBP patients will be important in determining whether the most important factors have been assessed.

Another limitation of the study could be the flexibility offered to patients to take the questionnaires home to be filled out due to ethical considerations. This has several implications. It is difficult to identify whether the patients' responses were influenced by family, friends or distractions while filling out the questionnaire. Secondly, the LBP disability outcome (RMDQ) is dependent on disability *today* which could affect the score and hence correlations if the questionnaire was filled out gradually over a few days, or with a physiotherapy session in between.

The choice of study design, cross-sectional survey, only allowed the researcher to investigate for strength of relationships between LBP disability and the selected factors at a point in time. The use of an alternative study design, such as a prospective longitudinal study would have allowed the researcher to determine for variables that predict change in LBP disability, and further inform the development of the PMP. Findings from this chapter inform us that a relationship is present, however we do not know how a change in a factor will affect LBP disability. Therefore, it is acknowledged that the identification of treatment components based on a baseline association with LBP disability, and not a predictor of change can decrease confidence in the selection of variables to address in a PMP. However, it was felt that a cross-sectional investigation was warranted before embarking on a prospective longitudinal study considering the lack of data available from Bahrain, and other Middle Eastern, Muslim or Arabic cultures.

4.5.12 Clinical implications

Findings from this study show similarities with relationships reported in Western literature except for catastrophizing. A recent review found that there is a lack of literature exploring the theoretical relationship between FABs and catastrophizing (Wertli et al., 2014b). As culture is expected to influence behaviour and weak relationships have been found with coping strategies, this warrants further investigation and understanding of health beliefs,

catastrophizing and LBP behaviours in context (Bahrain), to gain a preliminary understanding of normal cultural responses to pain before further exploring indicators of LBP disability.

Findings from this study recommend that the management of Arabic LBP patients should address FABs and other back-pain beliefs as in Western practice (Wertli et al., 2014a; Wertli et al., 2014c). Encouraging the use of strategies to ignore pain, which could influence the perceived ability to control pain and ability to decrease pain and all together reduce self-report disability, is also recommended.

Although the aim of a LBP management programme is not to directly reduce symptoms of depression and anxiety, studies have a positive change in outcome following modifications in beliefs and improved coping (Bath and Grona, 2015; Glombiewski et al., 2010; Wertli et al., 2014a; Wertli et al., 2014c). This is explained by the relationship between patients' beliefs about pain and the role of beliefs in their ability to cope with pain (Jensen et al., 1994b). Participants were more likely to feel anxious or depressed as they reported less effectiveness in controlling and decreasing their pain (Karoly et al., 2008; Viane et al., 2004). Hence, patients with negative back-pain beliefs that prevent them from utilising positive coping strategies, they are more likely to be disabled and possibly distressed (Karoly et al., 2008; Viane et al., 2004).

4.5.13 Recommendations for further research

It would be recommended to re-run the analysis using four-factor structure of the CSQ (chapter 3). Stronger and more significant correlations and LBP disability might be found using the four-factor structure that was suggest based on Bahraini patients.

Findings from this study have shown that relationship between fear-avoidance beliefs, depression and coping strategies is similar in Arab patients from Bahrain compared to those from other non-Western and Western countries. Such findings could help inform the exploration for determinates of change in LBP disability in Bahraini patients, and further support the development of a physiotherapist-led PMP for LBP in Bahrain.

A qualitative exploration of LBP patients beliefs and expectations would be necessary to determine if there any other important psychosocial factors that might be related to LBP disability. This exploration could explain findings from this study and asses the need to address social outcomes quantitatively.

4.6 Conclusions

The relationship between fear-avoidance beliefs, depression and coping strategies is similar in Arab patients from Bahrain compared to those from other non-Western and Western countries. Catastrophizing, amongst other coping strategies, were not associated with disability as previously found in the West. Previous studies addressing these factors in LBP pain management approaches have found reductions in LBP disability. Findings from this study encourage the investigation of the utility of these Western-developed concepts to address LBP disability with Bahraini LBP patients.

4.7 Chapter summary

The ability of psychosocial factors to explain LBP disability and predict changes in LBP outcomes encourages their acknowledgement in planning and delivery of LBP management options. This study aimed to first examine associations between pain intensity, back-related beliefs, fear-avoidance beliefs, coping strategies, and depression and anxiety with self-report LBP disability in Bahraini patients with LBP. The second aim was to examine whether these factors explained the variance in LBP disability. Data was collected from 199 patients with LBP in Bahrain. Most of the missing data was from the CSQ subscales, with 8.5% (n= 17) patients showing a third or more of their values missing. Results showed that LBP disability in Bahraini patients is associated moderately with depression, fear-avoidance beliefs about physical activity, pain intensity and back pain-related beliefs. There were low associations with fear-avoidance beliefs about work, anxiety, ability to ignore pain, and ability to decrease pain. After accounting for age, gender and pain intensity, fear-avoidance beliefs about physical activity accounted for 8.9% and 7% of the variance in the original and imputed data respectively. The contribution of depression and the ability to ignore pain was also examined after accounting for the same variable above, and they jointly accounted for 10.6% and 13.0% of the variance in the original and imputed data, respectively. Altogether, age, gender, pain intensity, back pain-related beliefs, fear-avoidance beliefs about physical activity and work, ability to ignore pain, control pain and decrease pain, depression and anxiety explained 34.7% of the variance in LBP. Cross-sectional associations between fear-avoidance beliefs, depression and coping strategies were similar in Bahraini patients compared other non-Western and Western countries; however associations with catastrophizing and other coping strategies, were not. Previous studies addressing these factors in LBP PMPs have found reductions in LBP disability. Although based on a cross-sectional design, findings from this study encourage the investigation of the utility of these Western-developed concepts to address LBP disability with Bahraini LBP patients.

Chapter V: A qualitative exploration of experiences and beliefs about low back pain in patients in Bahrain

5.1 Introduction

A quantitative analysis of factors associated with disability in Bahraini LBP patients has been conducted (Chapter 4). The findings that fear-avoidance beliefs, depression and the ability to ignore pain were the strongest predictors of LBP disability showed similarities with Western literature. Although the outcome measures used have been cross-culturally translated and adapted (Chapter 3), it remains possible that these Western-developed tools lack items that can identify issues specific to the Bahraini population. Therefore, it was decided that a qualitative exploration alongside the cross-sectional study (Chapter 4) would be useful to investigate ideas that have not been addressed quantitatively for the development of the intended intervention (Craig et al., 2008). This approach enables the exploration of multifaceted concepts (such as health beliefs, coping strategies, and experiences with LBP, family and within the healthcare system) within real-life contexts. Participants are likely to reflect cultural and environment influences as they illustrate concepts that are central to their LBP experience. Additionally this approach will allow the observation of interactions between the researcher and participants in context (Pope and Mays, 1995; Sim and Snell, 1996).

5.1.1 The low back pain experience

The qualitative literature on the LBP experience has focused on patients' interactions with healthcare professionals, their journey to legitimise their pain, and on their perceptions of the exercise component of LBP management. Additionally, most of the literature has been from Western cultures. A summary of the themes emerging in Western qualitative literature is found in Table V-1.

Table V-1 A summary of themes emerging from Western qualitative literature

Theme	Related sub-themes
Low back pain impacts the sense of self	• LBP changes an individual's identity • Maintaining social expectations and obligations • Changes in family roles and relationships
Coping strategies	• Reliance on passive coping strategies • Biomedical beliefs encourage fear avoidance behaviours • Recognising the need for acceptance
The legitimisation journey	• The search for diagnosis and reassurance • Communication with healthcare professionals • Negative emotions in the absence of a legitimate explanation
Patients' expectations	• Improved rapport with healthcare professionals • Access to further healthcare options such as; further diagnostics, pain relief, information, and suitable exercise programmes

A meta-synthesis by Snelgrove & Liossi (2013) reviewed the qualitative literature to identify patients' experiences of living with chronic LBP. The subordinate themes identified by the reviewers included (1) the impact of LBP on the self; (2) LBP experiences impact relationships with healthcare professionals, family and friends; and (3) lack of successful coping strategies. The authors suggested that the management of LBP should include educational components, address psychosocial issues, access to support groups and promotion of positive self-management strategies.

Froud et al. (2014) also reviewed the literature reporting on the impact of LBP on individuals' lives. Patients searched for diagnosis and management plans, but also expected explanations from clinicians for reassurance. Some patients suffered from sociological ambivalence; where they both struggled to maintain social expectations and obligations without having others doubt their pain. Based on their findings, the authors recommend that social circumstances need to be investigated further and better incorporated into management plans. Additionally, the authors reported that there was a lack of the effect of culture on LBP patients' social circumstances.

Bunzli et al. (2013) also conducted a meta-synthesis of the qualitative literature to encourage the transition from the bio-medical approach for LBP management. In addition to the themes identified above, Bunzli et al.(2013) found that consultations with healthcare professionals

encouraged passive coping, hypervigilance and fear avoidance behaviours, and pessimism towards recovery. Patients reported negative emotions in response to pain and inability to fulfil their own and others' expectations. However in some of the reviewed studies, participants identified the need to accept, but struggled to, the nature of LBP as ongoing, fluctuating and unpredictable. Similarly to the other meta-syntheses, this review reports that all of the included studies were conducted in Western settings.

A systematic review of qualitative and quantitative studies by Verbeek et al., (2004) found that LBP patients identified good communication with primary care professionals as a primary expectation from LBP consultations. Patients described good communicators as interested and sympathetic clinicians (Dima et al., 2013; Slade et al., 2009a), those who involved patients in decision making (Parsons et al., 2007; Slade et al., 2009a; Verbeek et al., 2004), and allowed patients sufficient time and attention while taking their medical history (Verbeek et al., 2004), and carrying out physical examinations. LBP patients considered their clinical visits valuable resources for advice (Slade et al., 2009a; Verbeek et al., 2004). Advice from clinicians provided clinic attendees with guidance for choosing self-management options to complement the prescribed therapy (Borkan et al., 1995; Dima et al., 2013; Parsons et al., 2007).

Meta-synthesis of the qualitative literature (Bunzli et al., 2013; Froud et al., 2014; Snelgrove and Liossi, 2013) found that most studies reported on patients' journeys to legitimise their pain; which include patients' accounts of their symptoms not being acknowledged by friends and family or healthcare professionals (Borkan et al., 1995; Dima et al., 2013; Parsons et al., 2007; Slade et al., 2009a; Verbeek et al., 2004; Vroman et al., 2009), inability of diagnostic tests to identify structural changes in the spine (Borkan et al., 1995; Verbeek et al., 2004), and failure to obtain referrals to specialists and further diagnostic investigations (Dima et al., 2013). Accounts of such stressful experiences (Chew-Graham and May, 1999) and the invisible and unpredictable nature of pain contributed to patients' distress (Borkan et al., 1995; Dow et al., 2012). Participants also report that pain was unpredictable and interfered with ADLs, as a results patients described incidents where fear of movement developed (Borkan et al., 1995; Chew-Graham and May, 1999; Dow et al., 2012; Vroman et al., 2009).

Finally, LBP patients have reported disappointment in the inability of the healthcare system to find a cause for their LBP or recommend effective treatment (Chew-Graham and May, 1999; Dima et al., 2013; Verbeek et al., 2004; Vroman et al., 2009), dissatisfaction with pain relief (Dima et al., 2013; Verbeek et al., 2004) long waiting lists (Dima et al., 2013), and lack of continuity with the same clinician (Parsons et al., 2007; Slade et al., 2009a).

Research into patients' beliefs and perceptions about the exercise component of LBP management highlighted a better understanding of how to promote motivation, engagement with and participation in exercise to manage LBP (Cooper et al., 2009; Crowe et al., 2010; Slade et al., 2009a; Slade et al., 2009b; Slade et al., 2009c; Sokunbi et al., 2010). In addition to the aforementioned expectations, a recent review of the qualitative literature found that participants prefer an individually tailored exercise programme, expect a healthcare practitioner to be present in an active and supervisory role, and prefer educational written material or resources that were comprehensible (Slade et al., 2014).

The LBP experiences and management expectations of patients in Bahrain are unknown. Slade et al., (2014) reported that all qualitative reports identified for their systematic review addressing patients' beliefs and perceptions about exercise with LBP were from the United Kingdom, Australia and New Zealand. Similarly, two other meta-syntheses of qualitative research on the impact of LBP on people's lives (Froud et al., 2014; Snelgrove and Liossi, 2013) found only one study from Iran that emphasized the importance of culture. Results are published in two studies (Tavafian et al., 2005; Tavafian et al., 2008) and showed that women with LBP lived with stress due the social pressure and expectations to maintain a well-managed home, to prioritise their family and children's needs over their own health needs and no expectations of family support. Tavafian et al., (2005, 2008) reported patients' lack of knowledge about LBP, available self-management options, and the use of unhelpful coping strategies; such as rest or over-exercising to manage a flare up of pain. These findings support the need to investigate such aspects qualitatively in Bahrain since they have not been detected by a quantitative approach (Chapter 4). Additionally, social pressures placed on Iranian women (Tavafian et al., 2005; Tavafian et al., 2008) seem to be different from Western (mainly UK and Australian) findings in the literature.

5.1.2 Focus groups

Focus groups, defined as group interviews with both a facilitator and co-facilitator, centre on a specific topic ('focus') (Sim and Snell, 1996). This format of qualitative data collection efficiently elicits qualitative data from multiple participants. The process allows the researcher to observe interactions between participants as beliefs and experiences are formed, shared and modified. An advantage of this process is the production of data that reflects socially acceptable and common experiences following participants' exchange of ideas. This is likely after participants share their views, and these views are confirmed or negated by other participants. The exchange of ideas is likely to reflect participants' own understandings of certain experiences or situations. Additionally, focus groups allow individuals to use their own language and expressions when sharing their beliefs and experiences (Dima et al., 2013;

Morgan and Krueger, 1993; Sim and Snell, 1996; Wilkinson, 1998). Therefore, the open and trawling nature of this qualitative method is appropriate for exploratory research questions in new areas of research (Gilham, 2005; Sim and Snell, 1996).

This PhD study started with a quantitative method that tested specific concepts (pain intensity, back pain beliefs, fear-avoidance beliefs, coping strategies, and depression and anxiety) in relation to LBP disability. Focus groups can be complementary to questionnaires in mixed-methods studies, because they can further explore such concepts with a few patients with the potential to uncover even more relevant topics using their own perceptions and definitions (Creswell, 2013; Sim and Snell, 1996). Additionally, focus groups also bring to light what respondents are prepared to openly discuss and elaborate on in the presence of their peers and shows how other patients might influence the content of the discussion (Barbour, 2013; Sim and Snell, 1996). This is useful in the development of a group-based intervention, because the researchers would be able to observe group-interactions beforehand and prepare accordingly. Finally, matching a facilitator of the same cultural background to the participants is expected to minimise the 'outsider' effect (Sim and Snell, 1996). It is likely to improve the tenor and gelling of the facilitator, co-facilitator and group members (Barbour, 2013; Gilham, 2005).

5.1.3 Rationale

Chapter 1 (see 1.4.1) examined Muslim and Arab beliefs such as God's test of a Muslim's patience, and *Kader* (destiny). Such Islamic religious and cultural beliefs affect individuals' interpretations of health and illness. Religion is also expected to affect coping strategies for LBP (see 1.4.3). Islamic literature emphasises the importance of practices such as patience, prayer and trust in God, to be used as resources for dealing with life difficulties (Aflakseir and Coleman, 2011). The items in translated and cross-culturally adapted tools (Chapter 3) were not able to detect the presence or absence of these coping strategies in the targeted population (Chapter 4). As seen from the Iranian studies (Tavafian et al., 2005; Tavafian et al., 2008), culture affects interactions with family members and impacts on the pain experience. For the reasons above, it is anticipated that LBP patients' experiences within the healthcare systems might differ to Western understandings.

It is difficult to provide satisfactory management plans for LBP because of their range of clinical presentations and patients' expectations following consultations with various healthcare professionals that have had limited success improving LBP outcomes. Although the views of Bahraini physiotherapists remain unknown, a preliminary understanding patients' experiences, beliefs and expectations should help inform strategies for LBP management and

therefore improve clinical outcomes (Dima et al., 2013; Parsons et al., 2007). Findings from a focus group may contribute to a patient centred mode of clinical practice (Sim and Snell, 1996). The advantages of the open nature of focus groups such as the generation of ideas that reflect socially acceptable and common experiences, allowing participants to portray their own understanding of issues, and using their language and expressions to describe their beliefs and experiences discussed in section 5.1.2, along with the logistics involved in bringing individuals together in a set place and time, could inform the practicalities of setting up a group treatment programme. Overall, a qualitative exploration will contribute to the development of a feasible and acceptable physiotherapist-led PMP in Bahrain.

5.2 Aims

The aim of this study is to understand the experiences and beliefs of patients with low back pain (LBP) in Bahrain with the intention of informing the design of PMP. To achieve this aim, the following objectives will be addressed:

a) to explore participants' beliefs and experiences living with and managing their LBP,

b) to find out their beliefs about their role, and the healthcare systems' and healthcare professionals roles in the management of LBP,

c) to obtain patients' views on group treatment to facilitate the development of a physiotherapist-led PMP to manage LBP in Bahrain.

5.3 Methods

5.3.1 Ethical approval

Ethical approval was obtained from King's College London Biomedical Sciences, Dentistry, Medicine and Natural & Mathematical Sciences Research Ethics Subcommittee (BDM/12/13-36) and Bahrain Ministry of Health Ethical Approval Committee (HM/SA/780/2013) (Appendices 6 and 7).

5.3.2 Participants

Inclusion and exclusion criteria

Participants were selected on the basis of the following characteristics and attributes to compare and identify patterns from the data, and be able to generalize to the rest of the thesis (Barbour, 2001). The aim was to collect data from 20 participants, or up to data saturation (Pope et al., 2000). Participants from the cross-sectional study (Chapter 4) were

asked if they were interested to take part in the focus groups and were provided with a written information sheet (Appendix 15).

Inclusion criteria: Female and male patients attending outpatient physiotherapy departments for LBP management over 18 years of age, had to have LBP that lasted ≥3 months, with or without radiating leg symptoms.

Exclusion criteria: Participants with specific inflammatory or other diagnoses. Such participants would not be eligible for a PMP and are expected to have different beliefs and expectations based on their diagnosis and medical management (Sloan et al., 2008).

Recruitment process

The researcher contacted the potential participants by phone two days later to provide them with further details about the focus group study and answer any queries. The ones who expressed interest were invited to attend a same-sex focus group, as suggested from informal conversations with patients, at their outpatient physiotherapy clinic at ITHC or SMC (see Table III-1, Chapter 3). A maximum of 12 participants were invited for each group to allow for non-attendance.

Upon arrival, all participants provided written informed consent to take part in the study, including audio-recording (Appendix 16). They also completed a short socio-demographic information questionnaire with a Visual Analogue Scale to measure for pain intensity. To maintain confidentiality, participants were assigned a code for data entry and a random subject identification number for transcription purposes.

5.3.3 Topic guide

The topic guide was developed following:

1. Literature review: information from previously reviewed studies (Briggs et al., 2010; Sigrell, 2001; Slade et al., 2009a; Slade et al., 2009b; Slade et al., 2009c).
2. Experiential knowledge form clinicians and researchers: advice from physiotherapists at four outpatient physiotherapy departments in Bahrain (see Table III-1, Chapter 3), an academic physiotherapist and an external experienced qualitative researcher (HL) was considered.
3. Lived experiences from patients: informal conversations with 10 patients from outpatient physiotherapy departments (5 SMC and 5 TPC) (see Table III-1, Chapter 3) were conducted.

The gathered information was used to create five semi-structured interview questions with relevant probes outlined below. The questions were translated to Arabic for patients. The translation process was carried out with the help of two physiotherapists to ensure maintenance of the intended meanings and structure.

1. Introduce yourself to the focus group and tell us about your back pain experience.
    - You might wish to talk about how it started, if you know, and a brief summary of your history.
2. Tell us about problems you experience as a result of having low back pain?
    - Tell us about problems that have limited your recovery? And why?
3. Tell us, how you take control or cope with your LBP?
    - What do you think can help you improve to control your pain?
4. Tell us what you think healthcare professionals can offer you?
    - What do you believe is the role of doctors? Physiotherapists? Other professions?
5. Do you think you can be taught / instructed / advised on (etc.) on how to cope with your low back pain?
    - And how do you think this [advice] can be delivered?

5.3.4 Focus groups

Pilot focus group

The topic guide was piloted with a female-only focus group (FG1) and a female co-facilitator (physiotherapy assistant). The content was transcribed verbatim in to Arabic and translated into English for familiarization of the data. Level 1 and 2 coding was undertaken in collaboration with an external experienced qualitative researcher, HL (see steps 1 and 2, Figure V-I). The content of the transcription of the pilot focus group was assessed for relevance and participants' understanding. Following discussion with HL, no further amendments were required for the topic guide for the main study (FG2 and FG3).

Main study

The researcher (DM) facilitated the focus groups. A female physiotherapy assistant and a male musculoskeletal physiotherapist co-facilitated the female and male groups respectively. DM kept a reflexive diary to recognise and acknowledge potential bias throughout the recruitment and focus group phases (Finlay, 2002; Maso, 2008). Both the researcher and assistants noted field notes to record attendance, comment on participation and group dynamics, and non-verbal cues. The field notes informed the practical aspects of PMP design. DM contacted

patients by phone five to seven days after the focus groups to clarify any emerging ambiguity identified by herself or the respective co-facilitator. To identify patients' reasons for not attending a group-based study; non-attendees were contacted. Phone calls to non-attending patients consisted of two attempts the following day and a third attempt two days after the scheduled focus group.

5.3.5 Data analysis

Coding and generation of themes

All focus groups were transcribed and translated by the researcher (DM) and uploaded to NVivo qualitative data analysis Software; QSR International Pty Ltd. Version 9, 2010. Qualitative content analysis was applied (Figure V-I). Content analysis is employed with inquiry designs that aim to describe a phenomenon under study within the presented context. In this instance, content analysis is appropriate because there is a lack of existing theories or findings in the literature on this topic (Hsieh and Shannon, 2005). The approach allows for the inductive formation of key concepts and themes; where key concepts and themes arise from the participants' qualitative data and are as close as possible to the material being analysed, rather than the use of preconceived categories (Hsieh and Shannon, 2005; Kondracki et al., 2002; Mayring, 2000).

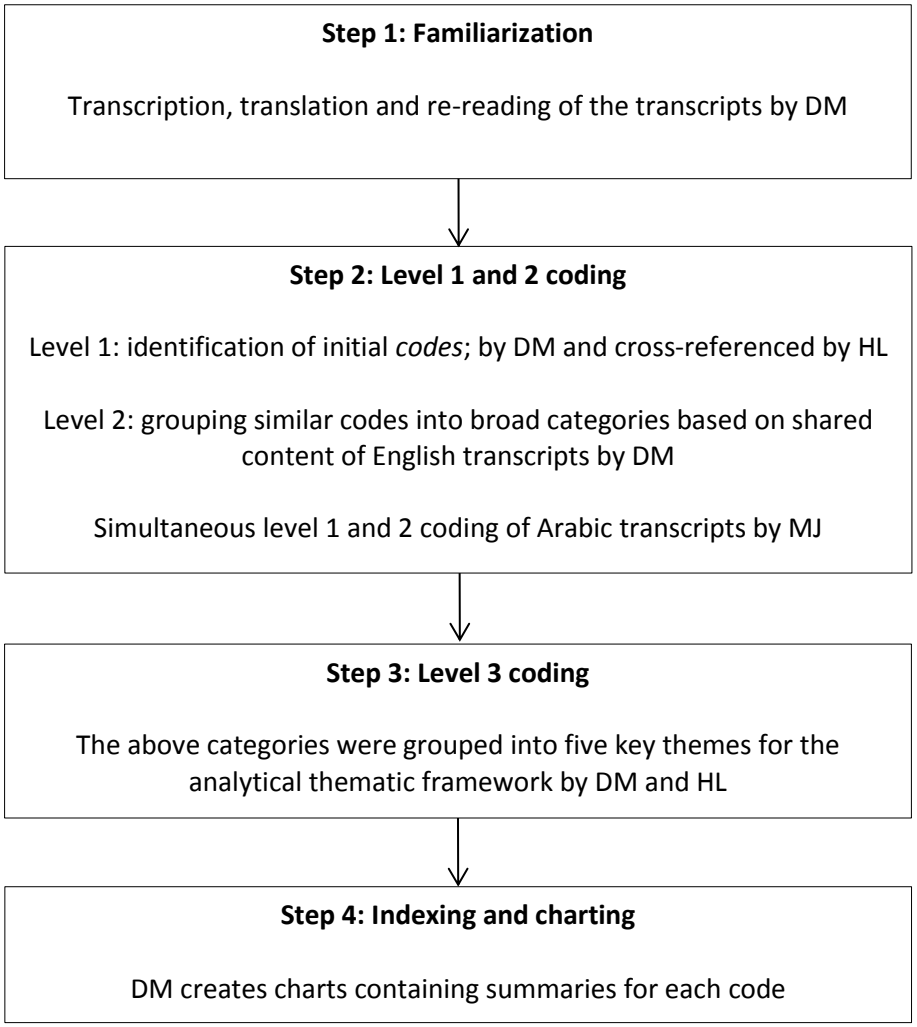

Figure V-I Coding and generating of themes

Step 1 – Familiarization

DM's familiarisation with the data took place during transcription, translation and repeated rereading of the transcripts. DM, who is bilingual in English and Arabic, transcribed the focus groups verbatim into Arabic (original language) and contacting the participants for further clarifications. Following that, the transcript was translated into English.

Step 2 – Level 1 and 2 coding

DM and HL, reviewed the transcripts of the pilot focus group (FG1, see Pilot focus group) in English text to examine the data (level 1 coding: detection of codes; key concepts, sentences or themes by which the data can be examined and referenced). DM further inspected the second and third focus groups, refined the initial list of codes, and undertook further axial coding (level 2) to group similar codes into broader categories, based on shared content.

At the same time a clinician (MJ) reviewed the original Arabic text and undertook level 1 and level 2 coding independently. (MJ provided a list of his emergent key issues in English).

Step 3 – Level 3 coding

After the initial coding, HL crosschecked the codes between DM and MJ in attempt to verify the translation process. Following that, DM and MJ reached an agreement about the codes and emergent themes. The codes were then grouped to create five key themes (level 3 coding). Following the third coding phase, the emerging themes were again discussed with the external researcher (HL). This step contributed to the final analytical framework under which the five main themes will be presented.

Steps 4 – Indexing and charting

The analytical framework was applied systematically to all the English transcripts using NVivo 9 by DM. Charts containing distilled summaries of patients' views were created for each key concept (code).

Validation

Steps were undertaken to strengthen the validity, robustness and credibility of the qualitative data. DM had contacted all participants to confirm that interpretations were in line with verbal accounts after each focus group. DM also contacted an expert clinician and one patient to validate key concepts after level 1 and 2 coding to determine whether the codes resonated with the clinical and personal experiences respectively. Following the reading of the first focus group, agreement was reached with an experienced external qualitative researcher (HL) for the emerging codes. Additionally, HL reviewed the level 1 and 2 coding results produced by DM and MJ. This step also helped corroborate the translation of the transcripts. Single

counting and inclusion of negative instances (deviant cases that refuted some of the emergent accounts) was applied to show the strength of the evidence from the available qualitative data and to validate the results (Seale, 1999).

Reflexivity

Reflexivity, is the process of a critical examination of how the researcher may influence and transform research (Finlay, 2002; Finlay and Gough, 2008), and was applied throughout the research process via reflexive diary to produce a reflexive statement.

DM was born and raised in Bahrain within an atypical Muslim family of two Western-educated, professional and working parents. She received her school education at an international school in Bahrain, and is fluent in English, Modern Standard Arabic and the local Bahraini dialect. DM has a clinical background in physiotherapy. Clinically she has worked in various musculoskeletal physiotherapy settings in the UK and Bahrain. She identifies as bi-cultural after spending about 10 years in the UK. DM acknowledges major religious Muslim festivals, however does not practice day-to-day rituals, nor is she adherent to female Muslim dress codes.

DM is aware of her past personal and clinical experiences, and academic knowledge influence on the choice of prompts in the focus groups, coding and liaising between HL and MJ, and validating concepts with a local physiotherapist and an external patient. Data analysis under the supervision and questioning of HL limited DM's biases during the data analysis procedure. With regards to the generation of themes, DM's bilingualism identified patients' usage colloquial and religious phrases in step 1 of the process. Furthermore, DM acknowledges the impact of her lifestyle and personal ideologies on the identified role of women and religion in the Bahraini culture.

DM expects that her Westernised appearance (a female who does not wear a *hijab*; hair cover and her affiliation with the UK) could have distanced male patients from participating and discussing sensitive psychosocial issues. On the other hand, she expects her appearance and background could have encouraged some patients to participate in something 'new' and participants felt able to express their opinions of the healthcare system and healthcare professionals given she had no affiliation to a Bahraini institution.

5.4 Results

5.4.1 Generating the thematic framework

HL found level 1 and 2 coding by DM (English transcripts) and MJ (Arabic transcripts) were similar. However, HL had the following comments: (i) healthcare professionals were always referred to as "he" or in the male gender throughout the English text, (ii) religious statements were frequently expressed as a method of coping by participants that were identified by codes of the English text but not Arabic text. Additionally, (iii) LBP was attributed to a fall on many instances. These comments provided by HL were discussed amongst DM and MJ. Both reviewers agreed that the two issues were more obvious in the English text because they were considered typical of the Arabic language; e.g. referring to individuals in the male form when generalising, and frequently using religious coping statements in daily conversation.

In the discussion with the senior physiotherapist it was agreed that the generated themes and sub-themes resonated with his clinical experiences; particularly the usage of passive coping strategies such as reliance on painkillers. The clinician particularly confirmed that it was common for patients in Bahrain to report their pain experience through religious statements, and attributing LBP to a fall or incident. And finally, he confirmed that it was common to address most healthcare professionals as "he" or "they" in their absence with no regard to their gender or plurality. The patient who lives with LBP confirmed that the generated themes resonated with her personal experiences. She identified key concepts such as; difficulties making time for herself, emotional burden of LBP, ineffective coping strategies, a need to get a second opinion, the importance of information and preference for same-sex groups were of particular relevance to her.

Following the discussions and further consultation with HL; DM, MJ and HL agreed upon an analytical framework. This meant that the identified topics were grouped into five interlinked key themes; (1) loss of independence and change of identity causes distress; (2) beliefs and attitudes towards low back pain; (3) trying to cope with LBP; (4) experiences within the healthcare system; and (5) participants' assessment of their needs.

Codes were applied to both the Arabic and English transcripts systematically by DM and MJ, and charted by DM for retrieval, exploration and single counting.

5.4.2 Participants

A total of 18 participants attended all three focus groups (14 females and 4 males, aged 25-74 (47.44 ±11.58). The researchers' felt that data saturation was reached and did not recruit any participants beyond the three focus groups.

Focus group one (FG1) had 6 females; participants 1-6, focus group 2 (FG2) had 4 males participants 7-10, and focus group 3 (FG3) had 8 females; participant 11-18. Table V-2 shows the number of participants who accepted the invitation to the focus groups, actual attendance and reasons for not attending.

Table V-2 Focus group attendance

Group	Confirmations	Attendance	Reasons for not attending	Timekeeping
FG1	12	6	Confused date and time (1) Other commitments (2) Other illness (1) Overslept (1) Transport (1)	*Participant 5* - approximately 25 minutes early to start her physiotherapy session *Participant 6* - approximately 15 minutes early because her husband was waiting for her
FG2	9	4	Did not reply (2) Forgot (1) Other commitments (1) Transport (1)	*Participant 7 & 8* – both were on time and wanted to leave on time regardless of others' unpunctuality *Participant 9* – approximately 15 minutes into the focus group discussion *Participant 10* – approximately 23 minutes into the focus group discussion
FG3	11	8	Did not reply (1) No transport (1) Other commitments (1)	All participants were on time *Participant 18* – spends an extra 6 minutes with research team

Nine participants were in full-time employment, 3 retired, 4 housewives, 1 student and 1 was unemployed. Participants had lived with LBP from 3 months to 20 years. Mean pain intensity score was VAS (SD) = 5.28 (±1.97). Their socio-demographic details are inTable V-3.

The focus groups lasted between one hour and two minutes (FG3) and one hour and 13 minutes (FG2). The conversation(s) in the transcripts and field notes show that participants gelled well with each other, and discussions flowed easily between them. Four participants did not adhere to the start and end times of the focus groups (Table V-2Table V-2).

Table V-3 Participants' socio-demographic information

Socio-demographic Information	Description	n = 18
Marital status	Never married	3
	Married	13
	Separated	1
	Widowed	1
Educational level	No schooling	3
	Elementary	5
	Secondary	3
	Graduate diploma	4
	Bachelor's degree	2
	Masters or equivalent	1
Work status	Unemployed	1
	Financial services	1
	Teaching / education	4
	Civil servant	2
	Manual labour	1
	Private business owner	1
	Housewives	4
	Retired	3
	Student	1
Work / Day Activity	Sedentary	3
	Part sedentary / part active	8
	Active	1
	Very active	6
Length of symptoms	3 – 6 months	3
	7 months – 1 year	3
	2 – 5 years	7
	6 – 10 years	2
	11 – 15 years	1
	16 – 20 years	2
Perceived reason(s) for back pain	No reason, gradual onset	2
	Road traffic accident	1
	Work-related incident	4
	Other type accident (unspecified)	4

Socio-demographic Information	Description	n = 18
	Lifting heavy load	3
	Participant not sure	1
	Other reason (unspecified)	1
	More than one reason	1

n: number of participants.

5.4.3 Themes

Findings are presented within the framework of the five main themes that emerged from the qualitative data (Table V-4Table V-4).

Table V-4 Themes

Theme	Sub-themes
Loss of independence and change of identity causes distress	• Loss of independence • Inability to fulfil expected gender roles • Engagement at work and fear of social isolation
Beliefs and attitudes towards low back pain	• Back pain causes • Colloquial descriptions of low back pain • Passive coping strategies • Unpredictable nature of pain • The cyclical nature of pain cultivates fear-avoidance beliefs • Instructions for exercise and movement • Perceived barriers to making changes
Trying to cope with LBP	• Ignoring pain and other distractions induce relaxation • Religious coping statements • Accepting LBP as a long-term condition • Seeking alternative therapies to reduce LBP
Experiences within the healthcare system	• The legitimisation journey • Dependency on medical management • Dependence on physiotherapy services • Views of surgery and surgical outcomes
Participants' assessment of their needs	• Clarity is important for improvement • Improvement the healthcare professional – patient relationship • The need to meet patients' expectations • Waiting times affect patients' progress

Theme 1: Loss of independence and change of identity causes distress

Participants' accounts of emotional distress such as 'being upset' were mostly coupled with the feeling of loss of independence, change of identity and fear of social isolation. The theme emerged from the two female focus groups.

Loss of independence

Participants (5/18) described how upset they were that they could not carry out certain activities of daily life any longer, such as putting their shoes on, or walking to the toilet independently as they previously did.

*"… The only thing that upsets me when I am in pain… I cannot depend on myself to do some things… I mean to pick up my shoe, I have to holler for one of my sisters to come and pass me my shoes… I cannot arrange my own [bed]room, someone has to come and do it for me… I cannot go down [bend downwards] *points to floor*…"*

(P1, female, 35 year-old, 7 months to 1 year of LBP)

Two of the 18 participants portrayed hopelessness when other patients were describing activities of daily living they can no longer do. For example, participant 12 interrupts participant 11's description of not being able to socialise at people's homes because she would have to sit on the floor with comments like;

"I feel this is it…"

And interrupts P11 again saying;

"… sometimes I cannot live my life…"

(P12, female, 37 year-old, 3 years of LBP)

Five of the six participants in FG1 described more emotions with regards to loss of their independence; three of them preferred that other family members do not help them because they felt guilty for not fulfilling their expected role within the household.

"Yeah sometimes they [family] say 'do not bend down, do not get up, rest… ', they [family] definitely care, a 100% to the extent you feel guilty, like she [other participant] said, they [family] will even help you put your socks on, and I find that painful [difficult to accept]…"

(P2, female, 43 year-old, 4 to 5 years of LBP)

Other emotions were also expressed with regards to independence. Two of 18 participants reported that hiring and supervising a cleaner would be a cause of stress. Another expressed embarrassment to have a family member drive her to work.

"One of the hardest things for me, is when someone says… 'let me know at least 3 or 4 days and I will drive you to and fro', [I mean to and] from work, and now he [husband] even arrives about half an hour early and waits for me outside so I do not have to wait around for him… and once both my husband and my son were waiting to pick me up, and the teachers came out and were like, 'you need two drivers to chauffer you around?'"

(P4, female, 34 year-old, 3 to 6 months of LBP)

Inability to fulfil expected gender roles

This sub-theme addresses accounts of family interactions and the participants' perceptions of their role within the family unit, and their reactions to help offered by other family members.

Eight females described how their roles and responsibilities were enculturated in them from childhood. As young girls, they were expected to help with housework and rather enjoyed the responsibility.

"… in the eighties after I finished school, early nineties, I had like a lot of housework [to do] as you might say… it was… like I'm saying… we were like heroes… we [girls at home] wanted to do everything… yeah… we make ourselves to be all that, picking that up and doing all of that [housework], I mean moving around and cleaning fridges and beds etcetera"

(P2, female, 43 year-old, 4 to 5 years of LBP)

Female participants (9/18) thought that the majority of their time was spent doing household chores (e.g. cooking or arranging the house) and/ or looking after their children (e.g. playing with children or supervising homework). Four of them (4/9) were in full-time employment and the fifth was in part-time employment. Participants' descriptions of household chores seemed similar despite their circumstances; one participant had a child with a minor disability (P14), another looked after her orphaned nieces and nephews (P2), one was a widow with no children (P3) and one a grandmother (P5).

"… [My] lifestyle… I get back home… I make some lunch and I move [arranging things] all around [the house]… um… um… I go over homework with my children I mean these [sort of] things…"

(P4, female, 34 year-old, 3 to 6 months of LBP)

Female participants (10/18) spoke about help offered from other family members and two of them thought it was considerate when other family members acknowledged their LBP. One participant felt that her family accepted her LBP more than she did;

"… people [family members] are accepting [of our situation], more than ourselves… "

(P2, female, 43 year-old, 4 to 5 years of LBP)

Additionally, three females (3/14), found it helpful when their husbands did not place any additional demands on them.

"… My children do not do anything [offer help in the house] but my husband helps me out… he does not do things [around the house]… but he does not put pressure on me…"

(P13, female, 38 year-old, 2 years of LBP)

Offers to help with housework from family members were reported from six females (6/14). Despite the offers, as seen from P18 below, females felt that they had to do all the housework.

"… [Replying to P13 above] Yeah me too he [husband] does not place demands, [imitates her husband] if you will do it [housework], do it yourself [you take the responsibility]… he does not say do this, do this, do this [housework]… Anyway you end up having to do it [housework]… who will [do it otherwise]…?"

(P18, female, 47 year-old, 3 to 6 months of LBP)

Six of the 14 females perceived support with household chores as not genuine and ended up doing all of the housework. The quote below reflects this experience and supports the earlier notion.

"Not to do anything? You cannot… you have to… You should not trust them [family], they say 'do not do this and that' [housework] and then they [children] go, 'mother, there's no dinner?'"

(P6, female, 57 year-old, 4 to 5 years of LBP)

Three of the 14 female participants described family involvement in their care, two of them reported their husbands made them hot water bottles when they were in pain, and the third said she was encouraged by her family to try *Hijama* (see 1.2.1). One of the four male participants described how he also has a wife with long-term LBP and has to look after her when she cannot sleep at night and had to bring her to hospital for pain relief.

The four male participants provided limited accounts about their social roles and required prompting. Only two of the 4 males (both elderly patients) said their LBP did not affect their family dynamics and rather enjoyed being around family.

"Really… on the contrary on Fridays when my sons, and my sons' children and my daughters and my daughters' children visit… when they all visit… quite the contrary I like being around other people…"

(P8, male, 74 year-old, 16 to 20 years of LBP)

Engagement at work and fear of social isolation

The participants' stated that they experienced benefits from their engagement at work. Four of the 14 female participants spoke about support from colleagues or work environments. Only one participant of the four explained that she did not receive any support from her employer. She was a sewing and handcraft instructor. The other three worked in education. Two of these found their colleagues in the school environment were supportive of their LBP; for example they offered to cover their classes when they were in pain and were able to forget

about their pain at work. The third participant described how her students enjoyed her teaching style regardless of her reliance on sitting at her desk.

"I mean if I stayed at home, it would be a crisis… I mean I am ill and my back hurts and I cannot move and staying at home it will be an even bigger crisis… but when I go there [school] with my people [colleagues], okay… I feel… they are always like, 'relax, no relax, do not overwork yourself, I will take the class for you'…"

(P18, female, 47 year-old, 3 to 6 months of LBP)

This last account also showed that participants were grateful to have a job and did not like feeling alone and isolated at home. Another participant spoke about her preference to work rather than take time off. Two of the other 7 focus group members, both of whom are home-makers, displayed signs of distress at the thought of being isolated at home.

P13: I do not like to take time off and I am a clerk so I know that this [job] affects [me], but I do not like to take it, but it's the opposite, going out with people that I see, I feel more comfortable with them, and I feel that nothing is wrong with me… opposite to when I am at home…

P16: It's suffocating… You feel… you feel, sometimes you feel normal and sometimes you feel so numb…

(P13, 38 year-old, 2 years of LBP and P16, 45 year-old, 7 months to 1 year of LBP. Both females.)

Two of 14 female participants provided accounts of fear of social isolation in non-work related contexts. One participant, who was widowed, felt that she was often alone at home with no family and disliked intruding on her extended family after her husband passed away. Another reported that her husband did not allow her to drive and as a consequence she felt isolated from family and friends, and unable to socialise independently or with her children.

"I need… sometimes to drive… to go out… hospitals… children related chores… any issues…"

The(P18, female, 47 year-old, 3 to 6 months of LBP)

Theme 2: Beliefs and attitudes towards low back pain

Patients' beliefs and attitudes towards LBP emerged as they shared their LBP histories, experiences and problems they have encountered as a result of their long-term condition.

Back pain causes

Patients believed their LBP was secondary to their lifestyle, jobs or a combination of both. Falls and other incidents while carrying out home related responsibilities were the most common causes of LBP. Seven out of the 18 participants attributed their LBP to falls; three of which were female accounts of falls while doing housework.

"I had a terrible fall, I was carrying a large plate of food going up [the stairs] and I fell horribly on my pelvis, and I slipped down, and I fell in a position like I was sat down sort of…?"

(P5, female, 52 year-old, 16 to 20 years of LBP)

Another two females (2/7) believed that their LBP started following a slipping incident in the bathroom and a fall on holiday. In contrast, two males (2/7) believe their pain was due to a fall while doing manual tasks at work.

"I fell... from a step-ladder... I fell… from a ladder! I mean from all the way up there to the floor..."

(P8, male, 74 year-old, 16 to 20 years of LBP)

Housework and work-related causes were also mentioned by another four participants but were not associated with falls.

"The pain I have is caused by my job mostly I think, not from housework, it is because I umm… I was umm… I have spent most of my life at work [sewing and handcraft instructor]…"

(P17, female, 46 year-old, 4 to 5 years of LBP)

All female participants agreed that LBP was a consequence of their expected female role within the household. This belief of the combination of continuous housework and/or work-related duties, and childbearing and childcare responsibilities has increased their pain overtime.

"I mean in addition to umm… I am not really adding anymore to [what other participants said], the reasons are known… its known, from housework and since we were young we took on certain responsibilities like she [other participant] said… but the bad thing was I felt the problem… I have a problem in my back that I did not address, and I did not treat it from the beginning and… I still did heavy chores and jobs… yeah… despite pregnancy and childbirth, and having babies and a household to run, and my husband always insisted that I get a worker [cleaner] and I always said to him, no I do not want [one] I do not like [the cleaner's help] so I rejected this offer completely!"

P5 laughs, and all participants of FG1 laugh and nod in agreement.

(P5, female, 52 year-old, 16 to 20 years of LBP)

The account above showed that the women undertook a lot of household responsibilities since they were young and therefore believed LBP was a result of accumulative physical and/or emotional stress on the back. Five of the 14 female participants spoke about the amount of housework they did as young girls; which included lifting furniture and cleaning under carpets. One of the five spoke about the warning she had from other women about of the consequences of continuous housework.

"We were not cautious… and they [older women] always say to us 'you will get hurt when you are older'… and we say 'No!!'… 'We have the energy to lift' [carpets]… and we lift… we lift it, we lift it, and put it away and it affects [us] but we do not notice it [pain] until now… and we do not divide the work… all of it back to back and then after a day or two you feel it.. 'I cannot [keep going]!!', it [the pain] has hit me properly…"

(P12, female, 37 year-old, 3 years of LBP)

Colloquial descriptions of low back pain

Participants used negative colloquial descriptors to explain their experiences. Interpretations of the phrases illustrated participants' beliefs. Five of the 18 participants used a variation of the verb "to break" to describe how tired or how much pain they were in.

"… but if the pain increases and I am feeling broken [shattered)]… I have to take it [painkillers]…"

(P8, male, 74 year-old, 16 to 20 years of LBP)

In another occasion, one participant uses "eaten up"; exaggerated terminology to imply "wear and tear".

"… My vertebras have been eaten-up since 2007… "

(P6, female, 57 year-old, 4 to 5years of LBP)

Three other participants used phrases that implied instability of their spines and consequently fear of movement.

"… They [healthcare professional] told me I had two beads that were falling [slipped structures]… "

(P14, female, 58 year-old, 4 to 5years pf LBP)

Passive coping strategies

This sub-theme encompasses accounts from 16 of the 18 participants' descriptions of a range of different passive coping strategies to deal with their pain. Seven of the 16 participants resorted to self-administered treatments such as a hot pack or a hot water bottle when they could not tolerate the pain anymore. One of them reported the use of an ice pack for pain. Four of them reported the use of medicated creams, herbal and massage oils on painful body areas.

"What can I do… if the pain gets worse… I either get a hot water bottle and I rest, or I rub myself, or I take my painkillers you know to ease the pain a little bit, and that's it, hot water bottle after the next…"

(P6, female, 57 year-old, 4 to 5years of LBP)

Half of the participants (9/18) believed that rest or sleep helped reduce their pain. Five of the 18 participants explained that rest was vital to help reduce back pain. For example one person was advised by work to take time off after his fall at work. Two were frustrated with their inability to schedule rest breaks at work. The account below elaborates one of the participant's difficulties obtaining sick leave to rest at home.

"[discussing requests for sick leave] … I only came to hospital because I need some [sick leave] – and they do not give you any rest [a note for sick leave]…"

(P18, female, 47 year-old, 3 to 6 months of LBP)

Four of the 18 participants combined painkillers and sleep when they experienced great pain. They believed this strategy would improve their unpleasant symptoms the next day. Two of the four (both females from FG3) stated that they socially withdraw from their families to their bedrooms to rest or sleep. This strategy stopped them from releasing their anger on family members.

"… On days where I am feeling tired, I leave everything, and I do not do anything, I lock myself in my room and just take my tablets… and I do my exercises, and I rest, and if I do not see results, so I do not get angry at those around me, and my children and my husband and wrongly blame them, this is the last thing – I mean my last resort – and the painkillers have not worked, the exercises have not helped, and I have had enough, [and] I cannot bear to see my mess all around, and not get angry at those around me, I just lay down and sleep…"

(P13, female, 38 year-old, 2 years of LBP)

Three of the four males in FG2 believed that lying down or napping was followed by unavoidable stiffness. In their view, rest was also a source of discomfort. This belief was only reported by male participants.

"But sometimes rest can break me [cause me damage or pain]… but sometimes I might need like a quarter of an hour to rest… movement is generally better… even sitting down for too long can tire me out…"

(P9, male, 46 year-old, 7 months to one year of LBP)

Unpredictable nature of pain

Participants appeared frustrated at the cyclical nature of LBP. Pain sensations in the back area were described as the major characteristic of their lower back problems. Only one participant described pain sensations in her leg with no significant pain in her lower back area.

"But when I get the pain, from working a lot [housework], and toing and froing, I get the leg pain first then in my back, all in my back… most of my pain is in my back… Yes all in my back, yeah all in my back…"

(P11, female, 50 year-old, 11 to 15 years of LBP)

The intermittent nature of LBP was a cause of annoyance to the participants. Regardless of its intermittent nature, ten of the 18 participants were always aware of it.

"… it [pain] is always there… it goes away for a while and comes back…"

(P1, female, 35 year-old, 7 months to 1 year of LBP)

Four of the 10 patients were aware of pain mainly at bedtime.

"I mean I am in pain, I am not in pain, that… that is a lot, but there is a lot of pain, even at night, I cannot sleep…"

(P6, female, 57 year-old, 4 to 5 years of LBP)

Nine of the 18 participants occasionally experienced an increase of symptoms in the morning. These reports were particular to patients waking up before sunrise for the Morning Prayer. The lower back stiffness experienced by patients in the mornings delayed an important aspect of their religious duties.

*"Me too [agrees with participant 8]… Yeah when I wake up like this *mimics waking up and stretching*… in the morning… like this… for the prayer, I cannot [tolerate the pain]…"*

(P7, male, 69 year-old, 3 years of LBP)

One described having to move around his bedroom or his house to be able to perform the prayer.

" [Speaking about his Morning Prayer routine] Yeah… when you [move around]… when I warm up… when my blood has circulated a little bit… when… it[stiffness] becomes… a bit better…"

(P10, male, 61 year-old, 6 to 10 years of LBP)

The cyclical nature of pain cultivates fear-avoidance beliefs

Patients' voiced their negative adopted beliefs relating to physical movement. Most of the patients (16/18) believed that movement could harm them. Five of the 16 participants were frustrated with physical activity that risked awakening dormant pain, and therefore developed fear-avoidance beliefs. They also believed that rest is important, particularly on 'bad days'.

"But it is enough for me to know that I am ill [with LBP], regardless, um whether I am feeling rested or whether I feel the pain I am ill, and I should be careful about [doing] this and that [activity]"

(P2, female, 43 year-old, 4 to 5 years of LBP)

Two of the 16 participants believed that they should avoid movements or activities that have previously caused pain.

"You need to avoid what affects you, if you can… I do not go out, I do not do anything out of my power…"

(P12, female, 37 year-old, 3 years of LBP)

One of the 16 participants (actually) said she was "scared" of movement.

"… Right now I cannot lift my little daughter, she is three years old, she comes towards me to play and I am scared of my back pain, I mean the doctor told me I have to rest, and right now I am on leave from work, sick-leave, for a month, to rest, so my back can go back to what it was…"

(P4, female, 34 year-old, 3 to 6 months of LBP)

The above quote also showed that participant 4 was advised by her doctor to rest. Examples of fear-avoidance behaviour seeded by healthcare professionals' advice to rest were shared by six of the 16 participants;

"… and now the doctor has begged me, he said 'if you want to try some treatment [medical management] you have to stop tiring yourself out at home,' …"

(P6, female, 57 year-old, 4 to 5years of LBP)

Four of the 16 participants were constantly worried about doing a "wrong" movement. They asked clinicians for advice to avoid the "wrong" movements that triggered or contributed to their LBP pain.

"… and for example you have this book here, how would you extend to pick it up… standing… the way you bend… maybe the way you have always bent forwards to pick something up… is the reason you have back pain [?] …"

(P10, male, 61 year-old, 6 to 10 years of LBP)

It is evident that fear of the re-occurring nature of pain, has led participants to limit their physical and social activities. Some described specific movements they avoided. For example, walking time, distance and stairs were reduced (6/16), bending and lifting heavy items at home and young children were avoided (10/16), and standing postures at work or during housework were limited (4/16).

P9: I avoid heavy… lifting heavy things at home…

P10: Me too… also standing for a long time…

(P9, 46 year-old, 7 months to one year of LBP and P10, 61 year-old, 6 to 10 years of LBP. Both males.)

From a religious point of view, three males of the 16 participants reported performing prayer from a chair to avoid bending and kneeling. To do that, they only frequented houses of worship that provided chairs.

"… Yeah they [houses of worship] do have chairs… everyone knows everywhere [all houses of worship] has chairs, but at home I have a chair… its more comfortable… but still if I crouched or bent over or I did this [mimics bending forwards] I mean… hurts… but even during religious occasions… Mataam's [houses of worship]… they all have chairs"

(P7, male, 69 year-old, 3 years of LBP

From a social point of view, females (5/16) limited their social outings because they feared pain would accompany prolonged sitting on the floor when visiting relatives, friends or mosques.

"If I sat below [on the floor] I won't be able to get up… so maybe if I go somewhere or like that… [someone's] home… I won't be able to get up… or even sit on [the floor]… that's why I just avoid everything…"

(P11, female, 50 year-old, 11 to 15 years of LBP)

One participant talked about how he avoided visiting areas with no *Arabic toilets* (squat toilet) to avoid pain from sitting on conventional Western toilet seats.

Instructions for exercise and movement

This sub-theme explores how participants placed a lot of importance on receiving and following instructions from healthcare professionals to reduce their fear of movement. According to the informants their pain returned despite following 'best' medical advice and 'being careful'.

"Gently… I am careful… walking, for me… walking is fine for me now… I walk and I do some exercise…"

(P9, male, 46 year-old, 7 months to one year of LBP)

Since sitting is an important aspect of many aspects of daily living and social events, and patients are faced with social situations where they might have to sit on the floor, eight of the 18 participants highlight the significance of correct sitting.

"Instructions… about things like… are we sitting wrong?... sitting… are we walking wrong?... [is] sitting on the floor [okay?]… shall I go up the stairs or not…?"

(P7, male, 69 year-old, 3 years of LBP)

The previous sub-theme showed that participants were fear-avoidant of activities or events involving sitting. Two of the 18 participants followed instructions provided by physiotherapists and used a pillow to support their posture, e.g. in sitting and in sleeping. One participant believed he had not been provided with the necessary information and he needs it to follow it.

"Instructions… about things like… are we sitting wrong?"

(P7, male, 69 year-old, 3 years of LBP)

Eight of the 18 participants realised the importance of doing exercises recommended to them by the physiotherapists. One of the eight participants adds that physical movements is more useful than electrotherapy and other modalities, and another signed up to an exercise class led by a physiotherapist to avoid 'incorrect' exercise.

"I do the exercises that are prescribed for me… I do them at home… I try to do them daily…"

(P9, male, 46 year-old, 7 months to one year of LBP)

Three of the 18 participants complained that physiotherapy exercises can be painful. They trusted advice from their doctors and attended their physiotherapy sessions. One of the three participants described his wife's reaction to his discomfort post exercise.

"Exercises are tiring… I swear to God, they are tiring… I tell you… like right now… this morning I left home well… and got here… to do my exercises… and then… at night I do not sleep… my wife says, 'you go healthy and come back ill, why?'…"

(P8, male, 74 year-old, 16 to 20 years of LBP)

Perceived barriers to making changes

Three of the 14 female participants believed their limited time was a barrier to making changes. They attempted but struggled to break down activities or household tasks as advised by physiotherapists but time did not allow them to and it was more convenient to rush housework and other responsibilities to save time. For example, one of the three participants' discussed walking for longer to finish her chores at the market. The quote also shows how the clinician induced fear in this patient by limiting her walk.

"[the doctor says] 'You should only walk for half an hour every day' half an hour? Sometimes I say, 'let me walk a little further', I walk a little further and go back home – I am finished [wiped out]! ... I have no energy for anything else…"

(P12, female, 37 year-old, 3 years of LBP)

Four of the seven working female participants perceived their jobs as barriers to recovery. Only one of the four participants reported that she was able to break down her tasks on 'bad days'.

"… because I work as a school clerk, especially in my job going back and forth, umm… always going up and down [stairs], I feel in myself that I cannot do my job, quite the opposite when I am at home, I can take a break and rest, I rest a bit, and with the exercises I can get up again, at work, I am just bothered [by the pain]…"

(P13, female, 38 year-old, 2 years of LBP)

Two of the 18 participants identified the lack of affordable public facilities to independently exercise, or continue with their exercises after discharge as a barrier to following physiotherapists' instructions. On the other hand, one of the 18 participants identified her lack of motivation to exercise independently as a personal barrier to adhering to instructions.

"My problem is I do not always stick… to… the exercises, I was given tummy exercises, to make it disappear, sometimes I do them sometimes I – know I am lazy – I do not do them, but I continue with walking."

(P12, female, 37 year-old, 3 years of LBP)

In contrast, male participants seemed to report more successful attempts at making changes at work to improve their LBP management. All four men in FG2 had manual labour jobs and found the nature of their work and lifestyle was tiring. Two of the four men were still in employment and were able to implement changes at work. This included the use of equipment at work to avoid heavy lifting and changing of their manual jobs.

"I have more of a managerial than a manual job like previously so it bothers me less..."

(P10, male, 61 year-old, 6 to 10 years of LBP)

Theme 3: Trying to cope with LBP

This theme explores participants' attempts at active coping strategies to improve their LBP.

Ignoring pain and other distractions induce relaxation

This sub-theme explains how half of the participants' (9/18) attempted to ignore or distract themselves from LBP symptoms. Of them, four females and one male participant described active distractions such as reading, going for a walk or to the mosque, and attending hydrotherapy sessions. They indicated that distractions help them relax and reduce stress levels.

"I go out and try to forget about the pain or whatever, go to the salon for manicure or pedicure and then I feel fresh and emotionally I feel better, so some of my stress goes away…"

(P3, female, 49 year-old, 6 to 10 years of LBP)

Participants (7/18) found that being around other people, such as family, helped distract their thoughts about their pain. Two of seven accounts were from females preferring to avoid having time off work.

"… [Speaking about work] but I do not like to take it [time off], but it's the opposite… I feel more comfortable with them [colleagues at work], and I feel that nothing is wrong with me…"

(P13, female, 38 year-old, 2 years of LBP)

Contradictory accounts from 2/18 participants described how ignoring pain for convenience (for example, to complete her house chores), could result in exacerbated symptoms the next day. The participant below reported that she felt 'upset' when her strategy to ignore pain was not effective.

"… So I can carry on, normally, when I am in pain… I generally ignore it… I feel it and I carry on… so it is only when it gets worse and I try to… to ignore it and that it is not there at all, it reminds me of its presence almost like 'I am here do not do this movement, I have not gone away' that is the only issue that upsets me"

(P1, female, 35 year-old, 7 months to 1 year of LBP)

Some participants found that general movement was useful to distract them from pain. Seven of the 18 participants manage their LBP by walking. Two of whom found it an easy exercise option, especially if they forget their exercises.

"Yeah outside I just do a lap, yeah outside my house, walking, yeah I do a lap around the house just like that for like half an hour and make my way home, and I feel less stressed and less pain…"

(P12, female, 37 year-old, 3 years of LBP)

Religious coping statements

Most participants (15/18) used statements that contained religious references to cope with their current LBP or previous experiences. Some (5/15) expressed religious phrases when introducing their story or when speaking of pain. These statements generally contained a phrase such as; "may you see no harm" or "may God protect you". These phrases imply that the speaker is asking God to protect the listener from the harm described.

"How did my problem start… yeah… I, may God protect you…. I fell… I fell a little bit… I fell and…"

(P7, male, 69 year-old, 3 years of LBP)

Participants also used similar words to acknowledge each other's pain and hope that God helps them too.

"Thank you all and I wish God bestows good health and all the best on you all… hopefully…"

(P5, female, 52 year-old, 16 to 20 years of LBP)

Four informants used phrases that show faith by calling on God for help in times of need. Others (10/18) reflected on positive experiences; such as a decrease in pain or the ability to complete an activity and attributed their success to God.

"I couldn't… the pain was extortionate in the mornings and as we say 'God helps me' I could not even lie down, and I could not sleep in a normal position, and being alone was the most painful aspect of it all, I thank God for giving me the power and motivation to carry on…"

(P3, female, 49 year-old, 6 to 10 years of LBP)

Half of the study cohort portrayed descriptions of frustration with pain accompanied by "swearing by God". The usage is aimed at emphasizing a point and making it clear how honest they are about the description.

"I swear to God… I am so fed up of this pain; it just does not go away!!"

(P16 female, 45 year-old, 7 months to 1 year of LBP)

Accepting LBP as a long-term condition

Only the females in FG1 (6/18) discussed the importance of recognising and accepting that they have a long-term problem. They acknowledged the importance of prioritising their needs to pace themselves, practice their exercises and relaxation. They felt that they needed to accept that LBP is a long-term condition to be able to make time for themselves.

"Yes, that is true, part of it making time for yourself is admitting that you have a problem in the first place; you will not make time for yourself until you accept that you have this thing [pain]."

(P2, female, 43 year-old, 4 to 5years of LBP)

Seeking alternative therapies to reduce LBP

Participants tried alternative therapies to help them manage their LBP. Four of 18 participants tried massage for example, one of which did not find it useful. Massage did not help improve her sciatic symptoms and felt massage was only beneficial for muscular back pain.

"It was okay, but I did not benefit from it because it [massage] was on the muscles, and I have leg [pain]…"

(P16, female, 45 year-old, 7 months to 1 year of LBP)

Two of 18 participants tried traditional massage and found it useful. One of the 18 patients reported that he was a traditional masseur, and traditional massage was one of the most useful techniques he has tried on his clients. Two of 18 participants tried traditional therapies; *Hijama* and *Al-kay* (see 1.2.1). Both had temporary beneficial effects. One of 18 participants reports being scared of trying *Hijama*. Another one of 18 participants was curious to know more about it.

"I tried Hijama, and I have also been diagnosed by them [traditional medical practitioners] with sciatica, and they said, 'Al-kay [cautery] would be beneficial,' so I did it here [points to leg] and here [points to lower back] the pain decreased for a while, but it came back…"

(P9, male, 46 year-old, 7 months to one year of LBP)

Theme 4: Experiences within in the healthcare system

This theme explores participants' experiences with healthcare professionals. Participants started their journey with doctors' consultations to diagnose their pain, followed by long-term physiotherapy treatment and finally considering surgical options.

The legitimisation journey

This sub-theme contains a summary of participants' experiences with medical professionals to legitimise their pain. Four of the 18 participants mentioned that doctors were their first point of contact after experiencing symptoms of LBP. Four of the 18 participants were referred for routine X-rays. One participant was referred for an MRI following his fall, another for a dynamic X-ray.

"I felt pain in my leg… I came to the hospital, and the doctor said, 'that's back pain not leg pain'… I said, 'No doctor there's a problem in my leg – I can't – I mean, my back, there's nothing wrong with it', I mean I cannot feel any pain. He said, 'No, you need to go for an X-ray'…"

(P16, female, 45 year-old, 7 months to 1 year of LBP)

Eight of the 18 participants thought it is important to be examined by a doctor for recurrent pain.

"In my case, I go to the doctor and tell him exactly what I am feeling and sometimes, after he diagnoses exactly what is wrong with me, yeah I just come to physiotherapy…"

(P3, female, 49 year-old, 6 to 10 years of LBP)

Another eight of the 18 participants emphasized the importance of receiving the correct diagnosis and described confusion associated with differing diagnoses.

[participants speaking over each other]

P17 … they all say different things… they first told me it was the start of a disc problem, and then after the X-rays they said…

P12 … first I was told my disc… then my vertebraes were moving… then something was putting pressure on them so how do we know…

P17 … we do not know what the truth is…

P13 … I mean what's the story…

P11 … and sciatica… what is sciatica?

(females, FG 3)

Discussions about diagnoses lead participants (5/18) to question receiving the same physiotherapy management despite taking different medication or labelled with a different diagnosis.

P18 Depends on the diagnosis

P12 The diagnosis [given by doctors] is different every time… and every time the [prescribed] medication is different!! Medication after medication!!

P17 And always the same [physiotherapy] treatment…?

(females, FG 3)

Two out of 18 participants chose to visit more than one doctor for a second opinion for their LBP and associated problems. Other participants (5/18) were examined by different doctors under the public healthcare system. Differing diagnoses and explanations further perplexed the participants. Some of them (2/5) have been attending regular follow-up appointments since accessing the healthcare system to remain on hospitals' records.

"The diagnosis is different every time… and every time the medication is different!!"

(P12, female, 37 year-old, 3 years of LBP)

A few participants (4/18) consulted doctors for other medical problems, such as kidney pain, osteopenia, cardiac disease and diabetes, which they perceived to be linked and potentially explain their LBP. For example, one of them had a urine infection that caused her pain on the side of her back and mistook it for a new symptom of LBP.

"I got a fever [from a painful lump in the middle of her back across her stomach]… and I got ill, and of course I went to see several doctors no one had any idea how what to do with me… the only doctor I did not visit, which I did not think in my life I would need to visit, was the kidney doctor…"

(P3, female, 49 year-old, 6 to 10 years of LBP)

One of the 18 participants had only visited one orthopaedic specialist for her LBP and associated symptoms. She had back pain for less than 6 months, and did not feel trapped in the healthcare system.

"Like I told you my experience is only just [new]… I have only visited the orthopaedic consultant and he has sent me for physiotherapy, and now here I am, I have not interacted with anyone else…"

(P4, female, 34 year-old, 3 to 6 months of LBP)

Dependency on medical management

Participants spoke despairingly about their long-term dependency on medication to reduce their pain. Five of the 18 participants considered a prescription for medication a reason to visit their doctor. Four of the 18 participants found medication had limited benefit.

"… the medication – even the ones I took from [private hospital doctor], … Honestly I shoved that aside in my closet as well, I have left them [medication] all, even though my vertebraes are inflamed, I felt the benefit from the exercises not the medication…"

(P17, female, 46 year-old, 4 to 5years of LBP)

A minority of participants (3/18) were aware of the side effects of using medication in the long-term, this included an account of side-effects following cortisone injections. Four of all the participants were not in favour of it as a method for pain relief.

P7: I had side effects from injections and pills… I got what's it…? And I was hospitalised for six days… yeah I got stomach ulcers…

P8: Oh the pills did that to you…?

P7: Yeah the pills… and afterwards the injections…. I was hospitalised…

(P7, 69 year-old, 3 years of LBP, and P8, 74 year-old, 16 to 20 years of LBP. Both males.)

A few participants (3/18) were also dependant on their doctors' referrals to physiotherapy or suggestion for injections or further investigations.

"… so I went to the doctors and they referred me here... and they took some X-rays... and he [doctor] said you have a disc [problem]... but it's a small disc [problem]... and I continued [here at physiotherapy]... and he gave me an injection"

(P9, male, 46 year-old, 7 months to one year of LBP)

Dependency on physiotherapy services

Participants spoke openly about their utilisation of physiotherapy services in both private and public healthcare systems. Most participants (11/18) report benefits from physiotherapy treatment. Very few (2/18) regularly attended physiotherapy when they experienced pain, compared to one who remembered benefits only from her very first session.

"… Yeah I just come to physiotherapy, I mean I go around and I still end up in physiotherapy… on the contrary, I benefit a lot from physiotherapy… this is my problem, since I was at work, since the begging of my disc problems until I retired because of that fall, so since the nineties I have been in physiotherapy… I do not even think of trying anything else…"

(P3, female, 49 year-old, 6 to 10 years of LBP)

Participants associated perceived improvement in symptoms to various physiotherapy modalities and shared experiences they did not find useful. Of 18 participants, four found hydrotherapy and pool exercises useful.

"Well the reason [for discarding all my medication] is, umm why? … I finished my pool therapy in Ramadan – and I feel better, right… on top of the exercises they have given me…"

(P17, female, 46 year-old, 4 to 5years of LBP)

One of the 18 participants reports visiting both private and public physiotherapy services and claimed benefiting from her private physiotherapy experience.

"… I mean when I went privately, and wasted all [the money] on myself I felt better! I mean I came to the [public] healthcare centre – I didn't feel the timings were suitable, short slots, and so long between session and session…"

(P18, female, 47 year-old, 3 to 6 months of LBP)

However, about half (7/18) did not find physiotherapy useful for their chronic LBP and four of them did not benefit from electrotherapy modalities specifically.

"The pain goes and comes back so I prefer the exercises… I think the electrotherapy just masks the pain… maybe it is better… even walking and some movement is always better if you forget your exercises…"

(P9, male, 46 year-old, 7 months to one year of LBP)

One participant, who worked as a masseur, met clients who regularly complained about the benefits of physiotherapy and therefore was sceptical about their impact on him. Additionally, he believed the lack of continuity with one clinician was the reason for his lack of improvement.

"I'm [my symptoms are] different every day, and my physiotherapist is different every session... how would they know my diagnosis, and I am not getting better…"

(P10, male, 61 year-old, 6 to 10 years of LBP)

It was discussed earlier that some participants found physiotherapy exercises painful. However, patients continued with physiotherapy as it seemed to be the only option offered to them. One explained she could only tolerate electrotherapy, albeit not finding it useful. She described how physiotherapy sessions left her shattered, using the Arabic word "broken" to describe her situation (see Colloquial descriptions of low back pain). The use of a negative colloquial descriptor could indicate that this participant has negative beliefs about physiotherapy exercises.

"… they gave me [healthcare professionals tried] everything [refers to treatment], even physiotherapy broke me… I mean even the doctors ask after I have physiotherapy, 'how do you feel?' or 'do you feel better?'… I always say, 'I feel like I cannot walk [after physiotherapy treatment] and I cancelled everything [all the sessions],' then the doctors say, 'that is it then' and now I am back to the one that does this [squeezes hand into fist and releases to indicating electrotherapy or suction cups]…"

(P6, female, 57 year-old, 4 to 5years of LBP)

Participants held physiotherapists responsible for advice and some (4/18) complained about the lack of adequate information from their physiotherapists about correct postures and movement for their LBP. This links back to previous sub-themes, see Instructions for exercise and movement and Perceived barriers to making changes.

P9 No one gives us this information [speaks about correct movements]…

P10 Yeah no one…

(P9, 46 year-old, 7 months to one year of LBP and P10, 61 year-old, 6 to 10 years of LBP. Both males.)

The majority of the participants (15/18) have been referred to physiotherapy services more than once. Although there were high expectations that physiotherapy would decrease their LBP, participants seemed uncertain of long-term outcomes. This is illustrated by the following account below.

P16 I mean how much longer do we have physiotherapy for…?

P17 [Physiotherapy is] never ending!!

(P16, 45 year-old, 7 months to 1 year of LBP and P17, 46 year-old, 4 to 5years of LBP. Both females.)

Views of surgery and surgical outcomes

Participants' consultations with doctors and physiotherapists lead them to develop their own perceptions of surgery for LBP and opinions on surgical outcomes. Despite their own doubtful views, they wondered if surgery was the last resort. Their reservations about surgery were due to their confusion about their LBP diagnosis. Only two of all the participants had both surgery and positive views on surgery for LBP.

"There are also some people… some who have had surgery and some who have not… they get the same [physiotherapy] treatment and exercises? How so? And they do the same movements? That means surgery is not useful if they are still doing the same [physiotherapy]…"

(P8, male, 74 year-old, 16 to 20 years of LBP)

Fear of surgery was expressed by half of the participants (9/18). Seven had acquired negative views following discussions with doctors. Fear of surgery seemed to be partly induced by clinicians, similarly to aspects of fear of movement. (See: The cyclical nature of pain cultivates fear-avoidance beliefs).

"But… please allow me [to add]… they told me, 'If you have surgery'… 'You will get half paralysed'…"

(P14, female, 58 year-old, 4 to 5years pf LBP)

Four of the 18 participants believed that the success of surgery was dependant on the availability and quality of post-operative physiotherapy.

"Even if you have surgery you need physiotherapy…"

(P11, female, 50 year-old, 11 to 15 years of LBP)

This point leads them to question their current adherence to physiotherapy and benefits of the service, and how that might impact them post-operatively. It also builds on participant 8's contribution above; questioning the success of surgery if patients continued to practice the same exercise.

Theme 5: Participants' assessment of their needs

This theme discusses patients' opinions about their needs. Several issues are brought to light; the importance of information and clarity about their condition and management options, the need to improve the healthcare provider – patient relationship, the need to meet patients' expectations and improving access to services.

Clarity is important for improvement

Some participants (6/18) wanted more information in general to help them manage their LBP. Others were more specific. For example, participants (5/18) expressed the need for clear information about their diagnosis to understand how to manage their low back pain. It would help them understand the treatment they were receiving. A few of participants (3/18) wanted written information; others preferred photographs (3/18) and demonstrations (3/18).

P10 It is very important to get the right diagnosis

P9 The correct diagnosis can make us feel better… as long as it is right and they do not scare us

(P9, 46 year-old, 7 months to one year of LBP and P10, 61 year-old, 6 to 10 years of LBP. Both males.)

Earlier it was discussed how participants felt doctors labelled them with different diagnoses. Here it is evident participants felt they needed different healthcare professionals to agree on a diagnosis to prevent confusion. Five of the 18 participants found that they were given different diagnoses or opinions by different healthcare professionals.

"The doctor said to me, when I went to Salmaniya hospital and they did my dynamic X-ray… they told me everything is like [shifted] to one side and they prescribed me the pool but of course I have not been at the pool here, it is always exercises and electrotherapy, the doctor (physiotherapist) who was here asked me to bring the X-rays, she said, 'you have a back strain' – I mean everyone says something!"

(P12, female, 37 year-old, 3 years of LBP)

Three of these participants were prescribed different types of medication, had different types of physiotherapy modalities, and heard differing surgical opinions that confused them. The account below supports participant 12's need for clarity.

"I am sure it is different from one to another… perhaps for one… one gets therapy… and another finds electrotherapy useful… another might not find electrotherapy useful… and they [patients] must be getting different information… so I think it is important to have some clarity…"

(P10, male, 61 year-old, 6 to 10 years of LBP)

Half of the female participants (7/14) conversed about the role of a balanced diet and weight loss to improve LBP management; however they were not getting the right information.

"Right… exercise… watch your food… an overweight body affects you [back pain], a lot, it can affect you a lot…"

(P5, female, 52 year-old, 16 to 20 years of LBP)

Female participants (5/14) wondered if different patients required different shoes because of their different back curvatures and if that would improve their LBP.

P18 They just say "straight"… no curves no nothing… we need more information so we know what to ask for…

P17 Well that's it isn't it… the curves in my foot… is it suitable for me… and the curvatures of my back… and the nature of my job?

(P17, 46 year-old, 4 to 5years of LB and P18, 47 year-old, 3 to 6 months of LBP. Both females.)

Other participants wanted to learn about anatomy of the disc structure (1/18), making changes at work (1/18), and safe exercises and walking (2/18).

Improvement in the healthcare professional – patient relationship

Participants (8/18) described their interactions with healthcare professionals. Half of them (4/8) were critical of the way doctors examined them. They felt doctors did not read their medical notes thoroughly and spent brief periods of time with them. An account from one participant shows a doctor was in a rush to examine her, without asking her to remove her *abaya*[6]. He was quick to discharge her despite her report of no improvement in symptoms.

"And you are seated there [being examined]… in your abaya… he says you have inflammation… the doctor I see… and he prescribes some pills… and I say, 'by the way, I have not benefited from them [pills], I took this prescribed course of treatment those ten days that you prescribed'… And when I go back, he just increases the dose, or he gives me a different label or a different type, and then he says, 'No it did not work', he says [doctor continues], 'this is it, you are done, the inflammation has decreased, what do you do?' And I say, 'Now, I do exercise,' he says, "okay, then you are done, you do not need me [my service]'…"

(P17, female, 46 year-old, 4 to 5years of LBP)

Few (4/14) female participants questioned whether doctors believed their pain and its consequences on their social obligations. Two of them added that doctors did not understand their problem.

[FG3 is talking about receiving different diagnoses and treatment plans]

"…The doctors do not know [what to tell us]…"

(P17, female, 46 year-old, 4 to 5years of LBP)

[6]An *abaya* is a black robe or garment worn by women over their clothes to maintain privacy and modesty. Wehbe-Alamah, H. (2008). Bridging generic and professional care practices for Muslim patients through use of Leininger's culture care modes. Contemporary nurse 28, 83-97.

Participants (8/18) had negative perceptions of physiotherapists too. Three of them report being left to exercise or use hot wax alone, and to turn off electrotherapy modalities.

"… they [physiotherapists] told me, 'put your hands in the wax'… I, myself, I put my hand and take it out, and I put the gloves on, I mean there is no there is no concern [for us]…"

(P18, female, 47 year-old, 3 to 6 months of LBP)

Four of the eight participants perceived the physiotherapists to have a negative attitude towards them. For example one participant described how her physiotherapist looked "bored", another reported being rushed out her hydrotherapy session.

"I mean… I mean yeah… they seem like they are bored… they put the machine on you and they go sit in the [other] room."

(P17, female, 46 year-old, 4 to 5years of LBP)

Some participants (3/18), two of which also had negative views, also reported positive interactions with some members of the physiotherapy team. One participant reported consistent positive encounters with physiotherapists.

"… to be honest they [physiotherapists] treat me well…"

(P13, female, 38 year-old, 2 years of LBP)

A few of participants (3/18) discussed their own and others' medical experiences abroad and placed greater trust in services abroad compared to Bahrain.

"I went to India, they told me I had two falling beads [slipped anatomical structures], and they said I did not need surgery, with exercise and that belt-thing as I remember, and a light bulb, and laser and some medicines and I got better, then I came back – yes that was all in India – I got back and I went to Syria, and they said to me when I went to Syria, they told me it was my disc [causing the problems]."

(P14, female, 58 year-old, 4 to 5years pf LBP)

Despite the negative perceptions, half of the participants (9/18) mentioned that they have trust in healthcare professionals' advice, followed and depended on it as outlined earlier. Female participants reported they were advised by doctors to decrease their workload or increase in rest periods.

"I mean the doctor told me I have to rest, and right now I am on leave from work, sick-leave, for a month, to rest, so my back can go back to what it was…"

(P4, female, 34 year-old, 3 to 6 months of LBP)

All four male participants revealed that they had trust in their doctors' recommendations for further treatment.

"… yeah I would do it [have the injection]... it's the doctor's opinion... in my case, [the] doctor said, 'just consent to the injection... and have faith in God'..."

(P9, male, 46 year-old, 7 months to one year of LBP)

One participant clearly stated that doctors must have an important role in LBP management because of the extent of their training.

"Of course they have a role, then why did they study and battle through to get into these specialities?"

(P10, male, 61 year-old, 6 to 10 years of LBP)

Following reflections on healthcare professionals' role and attitudes; a couple of female participants (2/8 from FG3) mentioned that changes were necessary in the public healthcare system. They recommend more initiatives, like this focus group, should take place to include patients and the public in consultations about services.

"… The individuals who want to fix the health care [service] are few…"

(P18, female, 47 year-old, 3 to 6 months of LBP)

The need to meet patients' expectations

A few participants spoke about their expectations from their healthcare professionals for their LBP. Few (2/18) preferred injections because they thought they were more effective for pain relief than medication and physiotherapy. One of them based this on his wife's experience with LBP.

"She [wife] was admitted [to hospital]… he [doctor] said: 'Yeah I will inject her, from behind'… and he said: 'If it did not help her, it will not cause side effects'…"

(P8, male, 74 year-old, 16 to 20 years of LBP)

One participant expected investigations in a new teaching hospital might explain her pain.

"And he gave me some pills and… it is still… I mean I am not benefiting at all from the drugs I am taking… a lot of pain, I mean it is very strong and severe and that's it… And I just remained like this, now I have been referred to [teaching hospital]…"

(P16, female, 45 year-old, 7 months to 1 year of LBP)

With regards to physiotherapy referrals, some participants (5/18) spoke about preferring specific types of physiotherapy modalities when they are next referred to physiotherapy. This

was based on their own or others' experiences. The account below demonstrates this, in addition to the use of a religious coping phrase, see *Religious coping statements*.

"But I really wish, I am hopeful to God to be referred to pool therapy because I have heard so much about how good it is, I have not tried it but I have heard that it is very good…"

(P13, female, 38 year-old, 2 years of LBP)

Waiting times affect patients' progress

Participants identified issues that could explain the lack of long-term benefit from their treatment. Earlier participants showed frustration about the lack of affordable exercise facilities and one participant spoke about her lack of motivation (see: Perceived barriers to making changes). This sub-theme discusses how long waiting times for healthcare services hindered patients' progress.

Some participants (4/18) found physiotherapy treatment courses were too short. Consequently, they visited their doctors to be referred back for further treatment.

"It is always 8 sessions then they stop… because… I have tried with them… do it properly right? Continue a bit with us isn't it? They give those with surgeries 10 sessions…"

(P17, female, 46 year-old, 4 to 5years of LBP)

Three of the 18 participants mentioned that their conditions worsened while waiting for appointments, this included follow-ups or referrals to doctors, physiotherapists, X-rays or surgery. One of them also complained about long follow-up periods to see a female physiotherapist in the evenings.

P8 *It stresses us out... the delays...*

P7 *Well this time... oh last time I got four months... this time he documented a six month follow up*

P8 *The period gets longer and the pain gets worse...*

(P7, male, 69 year-old, 3 years of LBP and P8, male, 74 year-old, 16 to 20 years of LBP)

Due to long waiting times, two of the three participants have considered private physiotherapy or surgical options. Both terminated their appointments due to cost.

"So I waited… I went back to [private hospital] to have surgery… the doctor said, 'I will let you in on something, about this hospital, the equipment required for your surgery is expensive, and here it is a very expensive procedure… why don't you go to doctor [doctor's name]? She is an excellent and well respected surgeon… He said, 'I warned you'... he did tell me before... yeah I swear to God he did tell me earlier that there it was going to be expensive, and it will cost me"

(P7, male, 69 year-old, 3 years of LBP)

Two of the 18 participants missed appointments. One explained it was due to the lack of motivation on one instance and a car accident on another. Both found re-arranging replacement appointments difficult.

"… and this time honestly I let them down and I did not come and continue, I have one or two more sessions left, I had a [car] accident and could not come, and I had an appointment at orthopaedics at Salmaniya, I did not know what time date and I did not go, I asked for another orthopaedic appointment …"

(P12, female, 37 year-old, 3 years of LBP)

5.4.4 Participants thoughts on group treatment programs

Participants discussed whether they would access group treatment programmes. Most participants seemed to be more concerned with the content (7/18) of the programme.

"What about [including] exercises… treatment methods and exercise…"

(P2, female, 43 year-old, 4 to 5years of LBP)

The females in FG1 (pilot) requested separate males and females groups.

"I mean in our culture if men were included… I am not saying we will not be comfortable… we will be but… Some issues you might not be able to discuss comfortably, like family-related issues and…"

(P3, female, 49 year-old, 6 to 10 years of LBP)

Each focus group commented that their group size was ideal (4 to 8 participants), except FG1 because 2 participants left early.

"Like you [other participant] said a bigger group might be better in case people pull out."

(P1, female, 35 year-old, 7 months to 1 year of LBP)

Three participants of the 18 (all females) specifically mentioned that they were initially worried and stressed about sharing their views in the presence of others. At the end they report having enjoyed the discussions and meeting other patients, and felt less stressed afterwards.

"I think I was relaxed… when you called I said, 'hmm I will see it might be stressful' but I was very comfortable."

(P4, female, 34 year-old, 3 to 6 months of LBP)

Participants were asked again during follow up phone calls on their opinion of a group-based intervention. Their responses in addition to reports from the focus group are reported in Table V-5.

Table V-5 Participants thoughts on group treatment programs

Depends on	Number	Suggestions
Time-related barriers, such as salaried work commitments stood in their way	5/18	Offer different group timings (1) Avoid popular religious occasions (1)
Frequency: participants preferred sessions to be regular like physiotherapy to benefit from them but not time consuming. Some thought it would be a lot of time commitment in addition to conventional physiotherapy.	5/18	Twice a month (1)
Content was an important deciding factor	7/18	Inclusion of hydrotherapy (1) Inclusion of electrotherapy (2) Combination of education and discussion (2) Other's experience (2) Treatment options based on examples of LBP (1)
Availability of transport	1/18	
Prospects for socialising	1/18	

5.5 Discussion

5.5.1 Summary of the results

Three focus groups of 18 participants, 14 of which were female, were conducted. Five key themes emerged from the data that improved researchers' understanding of patients' beliefs and experiences of LBP, and expectations of the healthcare system from two public healthcare locations Bahrain. The themes were (1) loss of independence and change of identity causes distress; (2) beliefs and attitudes towards low back pain; (3) trying to cope with LBP; (4) experiences within the healthcare system; and (5) participants' assessment of their needs. The themes showed differences in the experiences of male and female patients with LBP in Bahrain. The themes also showed that patients are uncertain about the support they are provided with at home (females) or from healthcare professionals. Their beliefs about LBP and coping mechanisms were underpinned by a combination of culture and experiences living with LBP. Patients recognized the role of physiotherapists and doctors in their management, and expected more of them. They identified reasons within the healthcare system that they perceived to be the reasons why they have not progressed previously, and shared their

thoughts on group treatment programmes showing that they preferred same-sex treatment groups, regular sessions, and for the content to allow for education and discussion.

5.5.2 Gender differences

Gender differences were most apparent from the first theme *loss of independence and change of identity causes distress*; which emerged from quotes taken from the two female focus groups (FG1 and FG3). Distress is more likely to be expressed by women, compared to men, due to expected cultural roles and pressures – worldwide and in the Arab countries (Hamid et al., 2004; Nasir and Abdul-Haq, 2008). Women are also more likely to internalise emotional discomfort, therefore exhibiting them as distress, anxiety and depression (Nasir and Abdul-Haq, 2008).

The gendered expected role in the family (see 1.3.2) is a major reason for women's negative emotional experiences described in this study. Gendered roles and their respective expectations have been deeply embedded in females since childhood. This became apparent in the accounts provided by female participants, similar to other studies (Hattar-Pollara et al., 2000). Egyptian (Hattar-Pollara et al., 2003) and Jordanian (Hattar-Pollara and Dawani, 2006) working women reported feeling upset, or guilty for not fulfilling their expected gender role. The studies showed women spent most of their free time carrying out household chores because these expectations were rooted from childhood and expected by them from their spouse, their own family and spouses'. They report a sense of pride and joy from well-kept homes and children's school success (Hattar-Pollara et al., 2000). Within the context of LBP, such lifestyles have served as both a perceived cause of pain and its subsequent episodes, and can be understood as an excuse for not prioritising self-management.

Females described instances where family members offered help at home, and husbands would not demand housework from their wives. Other Arab studies (Hattar-Pollara and Dawani, 2006; Hattar-Pollara et al., 2000) have not reported cooperation from husbands, perhaps because their samples consisted of healthy females compared to females with LBP in this study's sample. Participants in this study perceived offers of help from family members as not genuine. This resonates with findings from other studies (Hattar-Pollara and Dawani, 2006; Hattar-Pollara et al., 2003). Dow et al., (2012) found in their study that participants described a conflict between wanting their pain to be acknowledged by those around them but also wanting to appear to cope. This ambivalence commonly faces people when unwell, since they simultaneously want to be excused from certain social roles and responsibilities, and at the same time continue to be seen as a competent member of society (Froud et al., 2014; Radley and Billig, 1996). Dow et al., (2012) elaborated that in some instances, participants reported

'getting on with it' following failed treatment and coping strategies similarly to the female participants in this study. Walker et al., (2006) explained that study cohort members might have encountered low self-worth by accepting help from others, and this might be a reason why females in this study perceived offer to help as not genuine and 'got on with it'. Snelgrove & Liossi (2013) suggested that despite the lack of exploration into what methods improved the restoration of a sense of self, maintaining social roles helps.

Female participants reported distress at the inability to be independent with ADLs, household chores and social activities. Meeting nearby family and neighbours is very the most common method of culturally accepted socialising and support available to Arabic female. The inability to join religious or social events at family or neighbours' homes and local houses of worship due to pain could cause women to lose touch with their social support network and feel socially isolated (Bjorck and Maslim, 2011; Lim and Yi, 2009; Thomas, 2003).

A job is another socially and religiously acceptable reason for women to participate in society (Sidani, 2005). Participants described engagement at work as a method of maintaining independence and identity, and a deflection from their physical pain and emotional distress. Studies about working females (Hattar-Pollara and Dawani, 2006; Hattar-Pollara et al., 2003) concluded that women were grateful to have lives outside of their homes and perceived it as a privilege to have jobs. Women in those studies, similarly to one participant in this study, reported that their husbands controlled their outings, their jobs or working hours without consultation. This has left them feeling isolated and emotionally distressed (Hattar-Pollara et al., 2000, 2003), and emotional distress is known to be associated with LBP disability (Glombiewski et al., 2010).

Gender differences were also apparent in other sub-themes. For example, even though most participants attributed their LBP to a fall or accident, females tended to attribute it to falls while doing housework and males to falls at work. Another example was greater reported success in requesting adjustments at work by two of the currently employed males in this study, compared to the female patients. Again, the concept of social ambivalence is relevant here. Women may complain about the inability to break down tasks at work; however some preferred work to time-off. This could explain why the sub-theme *Accepting LBP as a long-term condition*, emerged from female accounts identifying the need to accept the pain and make changes. The third difference was between advice that was valued by both genders; reduction in housework and rest by females, and referral for medical advice or to take medication by males.

The results of this study clearly showed that particular family roles and expressed emotions that go with the loss of independence and change of identity were only expressed by females. In contrast Western literature showed reports themes from both genders with regards to loss of abilities and roles that define individuals' independence and identities, sense of loss when comparing the present self to a former self-image, and the importance of maintaining family and work relationships (Froud et al., 2014; Snelgrove and Liossi, 2013; Walker et al., 2006). However the review by Snelgrove & Liossi (2013) found gender differences were not explored in detail, with few differences highlighted with regards to roles, self-esteem and general well-being. Studies from Iran (Tavafian et al., 2005; Tavafian et al., 2008) explored female LBP experiences in a Muslim Middle Eastern culture, however lacked accounts from males. This makes this study one of the first to provide evidence in gender differences in LBP patients within an Arab socio-cultural context.

A few reasons why such concepts did not emerge from male participants have been extrapolated from DM's reflexive diary. Firstly, this could be due to the limited number of male participants, with 2 out of the 4 being over 70 years-old. Male participants could have hesitated to participate in a focus group lead by a female researcher. The second reason could be due to a culturally expected male image that participants adhered to; which includes shying away from openly discussing negative emotions (Nasir and Abdul-Haq, 2008). Thirdly, the presence of DM, a female researcher to lead the focus group, might have hindered their willingness to consider these concepts (Al-Krenawi and Graham, 2000; Padela and del Pozo, 2011). Additionally, there was lower interest from males in participation (compared to females), less than 50% of recruited participants attended the focus group and they had the most time-keeping issues. Although attendance and time-keeping in focus groups is difficult compared to one-to-one interviews due to the logistics involved in gathering groups of individuals together (Krueger and Casey, 2000), the male interest and attendance record could also be due to some of the factor discussed above.

5.5.3 Low back pain beliefs

Pain beliefs

Most of the participants attributed their LBP to falls as mentioned above; mainly at work or housework. This could be interpreted as a LBP belief in this population; one was expected to work, and look after their home and children (in the case of females), and will therefore end up with LBP as a consequence. Female participants reported being warned by their parents, similarly to accounts from Tavafian et al., (2008), and that they are now living their fate. This belief could be attributed to Muslims' belief in destiny, *Kader*. Kader may lead to fatalism in

some cases where Muslims believe that this destiny has been determined for them by God and so they shall live God's intended outcome. It is very common for believers to dwell negatively on this belief. However, this belief could facilitate positive coping. Pargament et al., (1988) described a collaborative coping style; where responsibility of the problem-solving is held jointly by the individual and God; both working together to solve problems. Most religions encourage this coping style. Hodge & Nadir (2008) recommend a spiritually modified approach for Muslims that acknowledges God's role rather than the use of secular terminology that is inconsistent with Islamic norms. Believers could be encouraged to accept God's will, accept *Kader*, maintaining Islamic values. Acceptance of LBP can improve coping (Froud et al., 2014). Muslims believe in reliance on God, therefore they are encouraged to take responsibility for change with the beliefs that the ultimate success is dependent on God. Meaning, participants are encouraged to problem-solve to cope while maintaining faith that God will help them succeed.

Catastrophizing

Participants' accounts were filled with Bahraini colloquial phrases that may be conceptualized as catastrophizing; exaggerated negative responses to actual or anticipated pain (Sullivan et al., 2002). Chapter 1 (see 1.4.3) introduced catastrophizing as an unhelpful coping strategy, which is closely associated with disability, pain, pain-related fear and symptoms of anxiety and depression (Edwards et al., 2005; Turner et al., 2000b; Wertli et al., 2014b). Additionally, catastrophizing has a strong theoretical relationship with fear-avoidance beliefs (Leeuw et al., 2007a). It was unexpected to find a weak relationship between catastrophizing and LBP disability using quantitative methods (Chapter 4). Findings from this chapter helped the researcher understand these phrases within context. Findings indicated that "catastrophizing" might be considered as part of normal speech to describe LBP, and is not associated with levels of disability. Such findings showed the usefulness of the qualitative approach in exploring this issue.

Although catastrophizing is a common finding with LBP patients (see 1.4.3) this study demonstrated a style of catastrophizing that was particular to their culture and language. Participants used phrases that were heavily loaded with catastrophic language to describe their pain, emphasize an experience, describe their diagnosis or convince the listener. Negative cognitions such as catastrophizing may in fact represent realistic appraisals of tangible losses experiences as a direct consequence of having back pain (Gatchel et al., 2002; Walker et al., 2006). Therefore, these phrases could inform us how pain and its consequences are perceived by this patient sample. Cognitive-based therapies for pain are based on the assumption that these pessimistic beliefs are a result of cognitive distortion. Challenging patients on the use of

these phrases to describe pain and other symptoms could help change their beliefs and decrease their anxiety levels (Wertli et al., 2014a; Wertli et al., 2014b).

Religious coping strategies

The results showed that most of the patients used religious coping statements when talking about LBP experiences. It is surprising that none of the patients described the use of a religious coping strategy when they were in pain or emotional distress to help them manage their symptoms, considering the emphasis Islam places on religious beliefs and practices as resources for dealing with life difficulties. Pargament et al., (2000) argued that methods of religious coping do not duplicate those of nonreligious coping. Participants in this study expressed the phrases in addition to other positive strategies such as; ignoring pain, keeping active, trying to accept the nature of LBP and seek alternative therapies.

Many individuals relied upon their religious beliefs and practices to help them cope with negative events (Froud et al., 2014; Pargament, 2001) particularly in Muslim and Arabic cultures (Al-Kandari, 2011; Nasir and Abdul-Haq, 2008). Religious coping may be compelling for individuals who are acutely aware of their own limitations (Pargament, 2001). Individuals with chronic pain often feel limited in their ability to control their activity and pain levels, and disruptions to their life. Therefore, religious coping can be employed in spite of these limitations and is sustainable throughout one's lifetime. Although some nonreligious cognitive-behavioural coping strategies also have these characteristics; such as distracting one's thoughts, religious methods offer the additional possibility of drawing upon a superior divine being (Hodge and Nadir, 2008; Pargament, 2001). In this case, activities such as praying, and quoting religious phrases, should not be considered as unhelpful. On the contrary, patients who exhibit such beliefs could be encouraged to participate in more active religious activities; which include attendance of social religious events at local houses of worship rather than practicing individually at home, and walking to their local mosques that provide chairs for comfortable praying rather than feeling socially isolated at home.

5.5.4 Participants' views on the healthcare system

The first theme *experiences within the healthcare system*, compares with Western patients' experiences. Their description of their journeys to legitimise their pain (Borkan et al., 1995; Dima et al., 2013; Parsons et al., 2007; Slade et al., 2009a; Verbeek et al., 2004; Vroman et al., 2009); which included confusion over the diagnosis; medical, physiotherapy and surgical management plans; and lack of continuity (Parsons et al., 2007; Slade et al., 2009a; Walker et al., 1999) have been described by patients from other cultures. Long-term dependency on

medication, and on physiotherapy services were also similar (Chew-Graham and May, 1999; Dima et al., 2013; Verbeek et al., 2004; Vroman et al., 2009).

The second theme *participant's' assessment of their needs* which covered patients' expectations of the healthcare system also resonated with findings from Western patients. A clear explanation of what is causing their pain, was important for the patients to accept their recommended management plans (Chew-Graham and May, 1999; Dima et al., 2013; Verbeek et al., 2004; Vroman et al., 2009). Participants articulated the need to have better relationships with their healthcare professionals (Dima et al., 2013; Liddle et al., 2007; Slade et al., 2009a; Verbeek et al., 2004), which included interest in and acknowledgement of their pain, thorough examinations, and comprehensive physiotherapy management with an attentive physiotherapists and shorter waiting times.

Both themes suggest that certain improvements in the delivery of treatment and healthcare professional-patient relationship would improve patients' experiences. Clear and lay LBP information would be helpful for this patient group to decrease their confusion and help place their medical, physiotherapy and/or surgical management options within context (Dima et al., 2013; Verbeek et al., 2004; Walker et al., 1999). A review by Verbeek et al., (2004) found that even when explanations were given, participants have often doubted their validity because it could have conflicted with their preconceived LBP beliefs based on prior experiences, or an insufficient examination procedure. Patients in this study reported that doctors were quick to diagnose their pain, and in some instances women questioned doctors who did not ask them remove their *abaya* for a thorough physical assessment. Therefore, it is recommended that consultations included an appropriate physical examination, following consent of patients to undress. Discussions should include reasons why further diagnostic tests are unnecessary, followed by comprehensive physiotherapy management if appropriate. Clarity could decrease their need to legitimise their pain, dependency on medication, manage their physiotherapy expectations and reduce anxiety during long follow-up periods (Dima et al., 2013; Verbeek et al., 2004).

Both themes also illustrate a dependency on the healthcare system. Patients depended on physiotherapists for advice; perhaps because they are perceived to be more knowledgeable about pain conditions compared to other healthcare professionals (Campbell and Guy, 2007). Although this shows to some degree that patients trust doctors and physiotherapists involved in their care, it also demonstrated that participants believed the professionals should be in charge. Participants did not discuss the need for joint-decision making with the healthcare professional. Dima et al., (2013) found that participants valued recommended treatment and

advice from healthcare professionals and used them alongside pain management techniques. The authors also suggested that participants who are dependent on healthcare professionals to make treatment choices for them were less likely to change their habits and were less confident in their ability to self-manage. The implications of this for a pain management program are twofold. Firstly, potential patients need to be helped in accepting responsibility to manage their LBP, and secondly to actively participate in the decision making process, to decide on management plans and goals that are of value to them. Liddle et al., (2007) found participants were more satisfied with treatment and less likely to base the success of treatment on "quick fixes" once they started accepting the importance of an active involvement in their recovery. This managed expectations even further. Managing expectations influences the level of treatment satisfaction and subsequently their ability to self-manage (Snelgrove and Liossi, 2013). Consequently, it reduces the number of healthcare consultations (Ferreira et al., 2010).

5.5.5 Limitations

The sampling method was not stratified to take age into consideration. As a consequence, views of older patients have not emerged from the data. Older participants with LBP would have different beliefs, perceptions and expectations for LBP (Snelgrove and Liossi, 2013; Walker et al., 2006). They are more likely to accept pain interfering with ADLs and sleep (Walker et al., 2006). In the current study, the two older participants were retired and therefore did not report on pain interfering with ADLs apart from preforming prayer.

Although attempts were made to contact patients who did not attend the focus groups, socio-demographic details and pain intensity data were not collected to compare them to attendees. Therefore this study is unable to comment on any differences in attendees and non-attendees clinical and socio-demographic characteristics. The availability of this data could have informed the researcher of any potential biases in the sample of attendees.

Another limitation of the study was the small number of work-related concepts that emerged. This could be attributed to the large number of housewives and retired participants. However, work-related concepts such as making changes at work (Froud et al., 2014; Walker et al., 2006), loss or inability to work (Froud et al., 2014; Walker et al., 2006), or referrals to and being trapped in compensation schemes (Gebauer et al., 2015) that frequently emerge in the western literature, might have not emerged from this study due to the recent and minimal support for individuals with long-term pain and disability in Bahrain (Social Insurance Organization, 2008). The meta-synthesis by Froud et al., (2014) found that participants not eligible for sick pay, often described incidences of not being able to take time off. A few

participants in this study mentioned the struggle to obtain certified sick-leave for work. Such work-related issues warrant further investigation in Bahrain.

As discussed in section 5.5.2, there were a limited number of male participants with 2 of the 4 being over 70 years-old. As a consequence, psychosocial issues such as gender roles at home, change in identity or any experiences that portrayed emotional distress did not emerge from male participants. As discussed under Gender differences (section 5.5.2), this could be due to male's hesitation of discussing such issues with a female researcher in a conservative society, however it is also difficult to generalize this concept based on a small sample of males in the study. Additionally, the lower interest from males and lack of adherence with time-keeping (section 5.5.2) indicate that this type of qualitative approach might have not been the most suitable for male participants' in this type of society.

Another limitation of this study was that it only took patients' views into account. Bahraini physiotherapists were not included in the study, and their view, experiences and beliefs reported throughout this PhD study remain anecdotal. The guidance on the development of complex-interventions supports the involvement of stakeholders, which includes both patients and clinicians, in the consultation process. However, in the case of this study (Chapter 5) the investigation of patients' beliefs and experiences were prioritized to understand their experiences and incorporate their needs into a suitable PMP, considering the overall aim of the PhD thesis was to develop a feasible and acceptable PMP for LBP patients. Regardless, it is important to acknowledge that the views, beliefs and experiences of physiotherapists collected at this stage of the intervention's development would be valuable. Therefore, it is acknowledged as a limitation of the study and recommended as a suggestion for future research.

It is important to take researcher bias into account in qualitative research, particularly where the findings in the literature are lacking. Critical self-reflection of the ways in which the researcher's social background, assumptions and behaviour impact on the research process is required for the assessment of reflexivity (Etherington, 2004; Finlay and Gough, 2008). A reflexive diary was kept throughout the three focus groups, a reflexive declaration of the researcher's cultural, clinical and academic influences are acknowledged and instances where reflexive processes might have occurred have been outlined. Questioning for clarifications by HL, who is a non-Arabic speaker, stimulated discussions with DM and agreements were reached. This was expected to limit the DM's subjectivity. On such occasion, it can be assumed that the subjectivity brought in by DM to data analysis discussions has been an advantage rather than a limitation to the study (Finlay and Gough, 2008; Maso 2008).

The researcher also acknowledges that she is a novice qualitative researcher. Being a novice could have influenced the generation of the topic guide, and the thematic analysis. However, the topic guide was developed following a critical review of the literature and consultation with both clinicians and academics in the field in attempt to reduce this bias. Second of all, an experienced qualitative researcher (HL) and another clinician (MJ) were involved in the thematic analysis to limit the researcher's bias. HL also reviewed the pilot group (FG1) to provide the researcher with a critique on her focus group facilitation skills before proceeding with FG2 and FG3.

A number of limitations mentioned in the above discussion such as the small sample of men participating in the focus groups and problems with time-keeping, the small number of older participants, and the lack of findings on work-related issues and men's potential psychosocial factors indicate that a different qualitative approach could be useful upon reflection. One-to-one in-depth interviews following a phenomenological approach could be have been implemented. The privacy in one-to-one interviews could encourage patients to discuss personal psychosocial issues in detail with the researcher. A phenomenological approach, where researchers investigate the perceptions of an experience (LBP) through participants' in-depth narrations will allow the researcher to present a description of the experiences of the individuals studied and their common experiences with the phenomena using their own language and statements (Creswell et al., 2007). Although this approach has its advantages, the interaction between participants and the researcher, attendance and time-keeping would not have been observed in one-to-one interviews. Additionally, focus groups tend to produce ideas and concepts that individuals are comfortable to share in the presence of others; which was advantageous in this context.

5.5.6 Clinical implications

Gender roles

Patients' perceptions of their role within the family unit and society need to be considered as part of the management of LBP patients in Bahrain. Such issues should be considered when subjectively assessing patients, jointly planning a management programme, and goal setting.

Coping strategies

This study found that patients in Bahrain utilize passive coping strategies which are similar to LBP patients in other cultures; such as reliance on painkillers, and rest or sleep though pain (Chew-Graham and May, 1999; Dima et al., 2013; Verbeek et al., 2004; Vroman et al., 2009). These findings indicate that it is important to identify these passive coping strategies and

facilitate change towards active coping. In addition, unhelpful cognitions and behaviours such as fear-avoidance behaviors and catastrophizing were found to be common in this patient population. Previously, findings from Chapter 4 showed that catastrophizing was common but was not associated to LBP disability. Findings from this chapter (Chapter 5), are contradictory. When patients were given the opportunity to share their opinions, beliefs and experiences (through the usage of focus groups), this unhelpful strategy was detected. This also shows that phrases demonstrating catastrophising are culturally-specific.

On the other hand, findings also showed that patients tried helpful coping strategies; which included universal strategies such as engagement in exercises, and culturally-specific strategies such as attempts to attend religious events (prayers in Mosques). Findings also showed that similarly to catastrophizing, coping statements were culturally-specific. Therefore, they have been described as religious coping statements because they contained religious and spiritual references. Within the context of these focus groups, the themes and sub-themes showed that the religious coping statements – although considered a passive coping strategy in Western literature (see 1.4.3), they could be a useful coping strategy in religious societies.

Patient-centered care

Although the views and experiences of physiotherapists and other clinicians involved in the management of LBP patients have not been taken into consideration, findings from this study show a need for an improvement in the relationship between patients and clinicians; which includes an improvement in assessment methods, communication styles, and explanations for patients' reassurance. However, it is also important to note that none of the patients reported on the need for involvement in joint-decision making. Most patients wanted answers and solutions from their physiotherapists or doctors. This could indicate that patients are not aware of the potential benefits of joint-decision making and / or the importance of self-management for on-going pain such as LBP.

Implications for the development of a physiotherapist-led PMP

The aforementioned clinical implications will be incorporated into the physiotherapist-led PMP to improve the acceptability of the intervention. Male and female participants will be separated to attend a same-gender group as requested by women attending the focus groups in this chapter. Patients' perceptions of their role within the family unit and society need to be taken into consideration when designing culturally-specific PMP. Therefore, it is assumed that participants are more likely to accept concepts covered in the PMP if underpinned by examples that are relevant to their perceived gender roles. This could include the use of task examples they can relate to; for example (1) breaking down the preparation of large meals

during large religious festivals for women, and (2) encouraging men to attend male prayer services at local Mosques with chairs rather than stay at home.

Problem-solving through realistic examples participants can relate to might improve their acceptability of the PMP (Hodge and Nadir, 2008). Other examples which could relate to both genders but are specific to this culture could include attending busy religious festivals, how to accept pain and prioritize it over family commitments, and how to communicate pain to family members and to delegate responsibilities. Culturally-specific examples are also more likely to get patients to reflect and devise more culturally appropriate coping strategies.

Findings of this study showed that it is important to take into account negative pain-related cognitions and behaviours; such as catastrophizing and fear-avoidance beliefs and behaviours. The approaches to challenge these negative cognitions and facilitate behaviour change in the original PMP framework will be retained in the PMP. However, during the explanation and discussion of such concepts, local terminology (e.g. “broken vertebrae”) that patients have used to describe their experiences will be reflected on. This will be done by anatomical and physiological explanations during the PMP sessions, relate it to their pain, and ask them to reflect on their choice of words to describe their situation, and how that might affect them as individuals, their family and healthcare professionals. Theoretical explanations of fear-avoidance behaviours, cycles of over and under activity, and the importance of positive coping strategies will be used to support this issue.

Participants will be involved in discussions to explain reasons for the absence of a straightforward diagnosis, based on the explanation of the aforementioned information. The PMP will aim to encourage and empower local patients to participate in dialogue and decision-making process with their doctors and physiotherapists, and motivate them to accept some degree of responsibility for their LBP management plans.

This study showed the cultural importance of praying and hoping and coping self-statements. For example, participants frequently used coping statements loaded with religious phrases to bless themselves and protect themselves or their fellow patients from harm. This format of reassurance could reduce fear and anxieties about pain. Therefore, this style will be used to convey information to patients. Western self-statements taught to patients with chronic diseases to improve coping imply that individuals are solely responsible for change. From an Islamic perspective, people are responsible for change but the ultimate success of their efforts is dependent on God (Hodge and Nadir, 2008). Therefore, simple phrasing of advice during the PMP with religious phrases that reflect these concepts could gain patients’ acceptance and motivate them to try to improve their coping mechanisms . Another important concept is

encouraging the positive and active religious coping strategies. Examples include encouraging the patients to attend their usual group-prayers instead of praying individually at home, or volunteering to undertake manageable and meaningful tasks during religious parades and festivals as they once did, rather than passively observing the occasion.

5.5.7 Further research

The themes generated from the exploration of participants' beliefs, experiences, and expectations of the healthcare system can help inform a more acceptable PMP for patients with LBP. Therefore, an investigation into whether the clinical recommendations synthesized above would improve the acceptability of a pain management programme is warranted following this study. Additionally, further exploration into LBP beliefs, experiences and expectations of elderly patients, male patients and work-related aspects would enable researchers to tailor LBP treatment approaches more specific to particular patients in Bahrain. Additionally, the views of Bahraini physiotherapists were not explored. An investigation of their views, beliefs and experiences with LBP patients could inform further development of physiotherapist-led PMP for LBP patients.

5.6 Conclusion

The qualitative exploration with LBP patients in Bahrain showed similarities and differences between Bahraini patients and findings from Western patients. Findings from this study showed gender differences with regards to concepts of loss of independence, changes of identity and distress. Religious and cultural beliefs have been found to influence pain-related beliefs, fear-avoidance beliefs and catastrophizing, which previously have been found to be similar to Western findings based on results of a quantitative study. LBP patients used a mixture of passive and active coping strategies, had similar experiences within the healthcare system and identified areas of improvements that need to be addressed, similarly to those patients with LPB of other Western cultures.

5.7 Chapter summary

Qualitative explorations of patients' beliefs and experiences are recommended alongside quantitative studies for the development of complex interventions. Three same-sex focus groups (14 females and 4 males) were conducted. Five key themes emerged that best described participants' beliefs and experiences of LBP and expectations of the healthcare system in Bahrain. They were (i) loss of independence and change of identity causes distress, (ii) beliefs and attitudes towards low back pain, (iii) trying to cope, (iv) experiences within the healthcare system, and (v) participants' assessment of their needs. Participants' views of group

treatment programmes showed preference for same-sex treatment groups, regular sessions, and for the content to allow for education and discussion. Results showed similarities and differences between Bahraini patients and findings from Western patients. There were differences between the experiences of female and male patients. Religious and cultural beliefs influenced pain-related beliefs, fear-avoidance beliefs and catastrophizing. These differences will be considered to alter the content of the PMP and improve acceptability with patients.

Chapter VI: Feasibility and acceptability of a physiotherapist-led pain management program in Bahrain

6.1 Introduction

Different physiotherapy interventions have been found to reduce the burden of LBP. For example, exercise, manual therapy and acupuncture have all been recommended for the treatment of LBP (see 1.2.1). The wide acceptance of the contribution of psychosocial factors to LBP disability (see 1.4) has encouraged the development and spread of multidisciplinary and physiotherapist-led pain management approaches that address psychosocial factors believed to be associated with and predictors of LBP disability. PMPs for LBP informed by principles of CBT, have been a common method for the reduction of LBP disability by facilitating behaviour change. Physiotherapist-led PMPs include exercises for physical re-conditioning, education to challenge beliefs, problem-solving to improve coping mechanisms, and goal setting to provide patients with realistic and personal motives (see 1.2.2). Although studies have found no differences in LBP outcomes following CBT-informed pain management approaches for LBP, other findings (Critchley et al., 2007) have shown that a physiotherapist-led PMPs is equally effective to usual care and spinal stabilization exercises and is associated with less healthcare usage. Consequently, they offer a cost-effective alternative to usual physiotherapy care.

6.1.1 Pain management programs in non-Western settings

Non-Western studies (Sahin et al., 2011; Tavafian et al., 2007; Tavafian et al., 2011; Yang et al., 2010) have investigated the effectiveness of PMPs on the reduction of LBP disability in patients with chronic LBP. An RCT from Iran, Tavafian et al., (2007) investigated the use of oral drug treatment (usual care) to oral drug treatment with an multidisciplinary PMP on 102 female LBP patients (intervention group). They found improvements in all quality of life (using the SF-36) subscales for the intervention group at 3 months compared to improvements only in bodily pain, vitality and mental health subscales for usual care. Tavafian et al., (2011), conducted a similar RCT on 197 male and female patients (males = 43). The intervention group had greater improvements in physical function, bodily pain and vitality subscales. LBP disability, measured by the RMDQ and Quebec Disability Scale was significantly lower in the intervention group at all follow-up points. Although both RCTs show favourable LBP outcomes in a Muslim Middle Eastern population, the PMP was assessed for its effectiveness in addition to and not against usual care. Participants were followed-up in the short (Tavafian et al., 2007) to medium-term (Tavafian et al., 2011) and therefore long-term effects remain unknown. In Turkey, Sahin et al.,

(2011) conducted an RCT investigating the effectiveness of adding a physician-led PMP to usual physiotherapy (exercises and electrotherapy modalities). They found improvements in pain and disability were significantly better for the intervention group at 3 months. The study did not include medium or long-term follow-ups. A cohort study (Yang et al., 2010) of 142 participants found that coping improved alongside a reduction in pain and LBP disability in Korea. The study collected data at baseline and post-intervention, and followed-up 27 patients between 3 to 6 months showing improvement in pain and LBP disability were greater in patients showing increased use of relaxation, task persistence and exercise. In addition to their lack of long-term follow-up, the authors did not use a LBP disability tool that was valid and reliable in their target language.

Findings from studies investigating the non-Western PMP show positive changes in LBP outcomes in the short to medium-term. Despite the lack of RCTs comparing a PMP on its own to a control or usual care arm, studies specifically targeting physiotherapist-led PMPs, and methodological weaknesses their findings concur with the Western literature, and other non-Western studies investigating PMPs with other kinds of musculoskeletal chronic pain (Cardosa et al., 2012; de Góes Salvetti et al., 2012; Kitahara et al., 2006; Man et al., 2007). Improvements were found in disability and pain intensity (Cardosa et al., 2012; de Góes Salvetti et al., 2012; Kitahara et al., 2006), physical domains of the SF-36 (Man et al., 2007), return to work (Kitahara et al., 2006; Man et al., 2007), decrease in catastrophizing and improvement in self-efficacy (Man et al., 2007) decrease in depressive symptoms (de Góes Salvetti et al., 2012) and decrease in medication usage (Kitahara et al., 2006) from non-Western cohort studies. Of them, only one study (Kitahara et al., 2006) did not use validated self-report outcome measures. The studies from Malaysia (Cardosa et al., 2012), Hong Kong (Man et al., 2007) and Japan (Kitahara et al., 2006), in addition to the RCTs from Iran (Tavafian et al., 2007; Tavafian et al., 2011), have noted the influence of culture on treatment acceptability and efficacy. However, none of these studies report any preliminary findings from their respective patient populations to serve as guidance for modifying or improve the content of the interventions to increase acceptability and efficacy with patients. The current thesis reports findings from research of the Bahraini populations' LBP experiences and health beliefs (Chapters 4 and 5) using valid and reliable self-report outcome measures (Chapter 3). The next step would be to test the feasibility and acceptability of this modified intervention with the target population and in partnership with the targeted communities.

6.1.2 Assessing the feasibility and acceptability of a pain management program

Relevant findings from this thesis

The aim of this thesis was to conduct several studies to inform the development of a feasible and acceptable PMP for Bahrain. Findings from the systematic review (Chapter 2) showed that non-Western researchers examined relationships between disability and bio-medical factors more frequently than psychosocial factors. The review found evidence was moderate for a moderate association ($0.30 \leq r \leq 0.60$) for LBP disability with pain intensity and no association with symptom duration. Evidence was strong for fear-avoidance beliefs (FABs) having a low association (≤ 0.30) with LBP disability. Despite the strength of the association to FABs, the level of evidence for FABs (psychosocial factor) is stronger than for pain intensity or symptom duration (bio-medical factor). This supports the use of PMPs that primarily address psychosocial factors such as FABs. Results of Chapter 4 showed that LBP disability is associated moderately with depression, FABs about physical activity, pain intensity and back-pain beliefs. Although PMPs do not aim to reduce depression or pain intensity directly, negative beliefs such as FABs about physical activity and consequences of LBP are addressed. Findings from Bahrain warrant addressing and attempting to modify these negative pain beliefs. The cross-sectional survey (Chapter 4) found low associations with fear-avoidance beliefs about work, anxiety, and two coping strategies: ability to ignore pain and ability to decrease pain. Therefore, strategies to reduce anxiety and to increase the use of problem-solving skills to enable patients to develop active coping strategies would also be useful to this patient population.

Chapter 4 identified praying and hoping, and coping self-statements as the most commonly used coping strategies. Although regarded as passive coping strategies in most Western literature (see 1.4.3), Chapter 5 provided us with insights on the cultural importance of praying and hoping and coping self-statements. For example, participants frequently used coping statements loaded with religious phrases to bless themselves and protect themselves or their fellow patients from harm. This format of reassurance could reduce fear and anxieties about pain. This style will be used to convey information to patients. Western self-statements taught to patients with chronic diseases to improve coping imply that individuals are solely responsible for change. From an Islamic perspective, people are responsible for change but the ultimate success of their efforts is dependent on God (Hodge and Nadir, 2008). Therefore, simple phrasing of advice during the PMP with religious phrases that reflect these concepts could gain patients' acceptance and motivate them to try to improve their coping

mechanisms[7]. Another important concept is encouraging the positive and active religious coping strategies. Examples include encouraging the patients to attend their usual group-prayers instead of praying individually at home, or volunteering to undertake manageable and meaningful tasks during religious parades and festivals as they once did, rather than passively observing the occasion. Additionally, findings from Chapter 5 provided this thesis with insights on the expectations of the female's role. Therefore, the examples in the intervention were designed to reflect gender-specific activities, house-related chores and job roles to enable participants to relate, reflect and improve their acceptability of the intervention. Using cultural and gender-specific examples is expected to improve patients' compliance, and both patients' and their family's acceptability of the programme and consequently reduce the stigma associated with seeking further care for a chronic condition (Hodge and Nadir, 2008).

The intervention

The findings above were incorporated into a PMP based on an intervention guide developed for the Physiotherapy Department at Guy's and St. Thomas' NHS Trust based on the principles of the Back to Fitness Programme by Klaber Moffett and Frost (2000), see 1.2.2. The aim of the PMP was to reduce the emotional distress and unhelpful beliefs associated with chronic pain, such as catastrophising and fear of movement and re-injury; engage in physical activity; increase activity and participation; and encourage self-management using a CBT approach. It consists of a combination of modern concepts of chronic pain, the use of positive coping strategies, group general strengthening, stretching and light aerobic exercises progressed according to pacing principles, and the encouragement of a graded return to usual activities with goal-setting. An overview of the programme and cultural adaptations outlined under *Relevant findings from this thesis* (section 6.1.2) are found in Table VI-1. The full programme is found in appendix 23.

The programme which was originally split over 8 sessions was modified to be delivered over 9, 60 minute sessions delivered over 3 weeks. The 9 sessions are each divided into education/discussion for 40 minutes and 20 minutes of exercise and/or relaxation. The maximum number of subjects in a group was set to 12 participants based on responses on favourable group size from participants in Chapter 5. Sessions were led by the researcher (a senior physiotherapist with two years of experience in chronic pain management) with support from a same-gender assistant (physiotherapist with at least 5 years of musculoskeletal experience). Participants were provided with an accompanying course manual, which

[7] Examples include the usage of phrases such as: *inshallah*; if God wishes us to, *hamdulilaah*; thank God, or *bi ithen allah;* with God's permission.

contained all theoretical and physical components of the course translated into Arabic with culturally-specific examples. Male and female participants were allocated their respective gender groups as requested by participants (Chapter 5) and to comply with the outpatient physiotherapy departments' method of service provision.

Table VI-1 An overview of the physiohterapist-led pain management programme and cultrual adaptations

Session		Aim(s)	Culturally-specific adaptations
1	Introduction	To introduce the course, explain the main aims and material to be covered in the following 3 weeks.	Patients are introduced to the concept of the over – under activity cycle and shown how this inconsistent attempt to return to activity is detrimental to long-term increase in function. *Culturally-specific examples* are drawn from participants' experiences.
2	Anatomy and common pathology	To help patients understand basic anatomy relating to the musculoskeletal system.	This session is particularly directed at helping patients understand how their bodies are put together and to de-mystify common pain conditions with normal language and explanation. It also aims to recognise difficulties encountered when patients are either given no explanation or diagnosis for their pain or multiple diagnoses by different professionals. *Culturally-specific phrases* such as "eaten-up" and "broken" vertebrae are challenged.
3	Pain and damage	To provide an overview of modern ideas about pain; namely to introduce the biopsychosocial concept and also to understand the role of the central nervous system in the generation and maintenance of chronic pain.	Emotional and psychological factors in maintaining pain are discussed and how "fear-avoidance" can maintain a cycle of de-conditioning. The de-conditioning cycle and the benefits of setting manageable baselines, and building up activity slowly are discussed. *Culturally-specific examples* are used the male or female groups respectively. These examples can be drawn from stories patients share. The key message of this session is that chronic pain, of itself, does not mean damage.
4	Posture, pain and movement	To help patients understand the relationship between posture and pain. The aim is not to teach 'good' posture, in contrast to the principles taught on back school programmes. Patients are shown various postural types and asked to consider how it relates to their own posture.	Patients are asked to relate to their own experience how being in prolonged postures without moving is often uncomfortable. *Culturally-specific examples*: Females may wish to discuss common housework posture and men may wish to discuss manual jobs (if appropriate). Patients are encouraged to discuss what they consider 'safe' and what they consider 'damaging' movements or activities. Try to relate this to male and female *culturally-specific examples* if possible. This session often addresses patients' fears regarding specific activities such as bending and lifting and gives an ideal opportunity to challenge long held unhelpful fears and beliefs.

5	Managing flare-ups	To improve participants' ability to self-manage 'flare-ups'. Flare-ups (exacerbations of symptoms) are discussed.	The physiotherapist facilitates participants to develop a list of new more active coping strategies to manage flare-ups in the future. These include, pacing techniques, exercise, and relaxation and avoiding bed rest, unnecessary panic, visiting the doctor. *Culturally-specific and valued examples* such as prayer positions, walking to and attending services mosques and other houses of worship, visiting neighbours, and playing with children/grandchildren are discussed.
6	Goal setting and changing habits	Goal setting: to introduce goal planning as a strategy to inspire patients to overcome obstacles and work towards long and short term targets rather than focusing on the difficulties and negative aspects of living with a chronic pain condition. Changing Habits: to encourage participants to identify positive and negative coping strategies and how they have changed past negative behaviours.	*Culturally-specific coping activities and valued goals* are incorporated from session 5.
7	Pain and negativity; and group planning session	Pain and negativity: to encourage participants to identify the link between thoughts, beliefs, feelings and actions. Group planning session: Patients discuss their goals in groups of 2-3 and feedback to the group.	It is explained that continuous negative thoughts about a chronic pain condition can be very unhelpful in managing pain. Patients are asked to come up with negative thoughts related to their pain. They are re-assured that to have such worries is normal but also unhelpful if prolonged and never challenged. *Common cultural beliefs and negative thoughts about pain* are identified, discussed and challenged.
8	Goals and exercise planning	To encourage participants to finalise their goals for the next 6 weeks.	The physiotherapist encourages patients to choose *goals they can relate to*. *Common cultural occasions, religious festivities and family dynamics* are reflected on to help patients identify barriers to their plan and how to overcome them.
9	Group review and relaxation	A general discussion on participants' perception of the programme and any final questions.	*Culturally-specific and acceptable examples* are reflected upon in context of any issues that are raised.

Feasibility testing

The National Institute for Health Research (NIHR) Evaluation, Trials and Studies Coordinating Centre define feasibility studies as studies used to estimate important parameters that are needed to design the main study. Additionally feasibility studies are shaped by defining relevant feasibility outcomes (Craig et al., 2008; Whitehead et al., 2014). There is an increasing

emphasis on the importance of preliminary work prior to the organisation of large-scale, publically funded randomised controlled trials. This is recognised by leading funding streams such as the NIHR's Research for Patient Benefit and the MRC (Whitehead et al., 2014). A feasibility study is important to determine whether the extrapolation of the intervention (PMP) is appropriate for the new targeted population (Bahraini patients). The circumstances call for a feasibility study (Bowen et al., 2009); (1) partnerships with Bahraini physiotherapists need to be increased and sustained following initial research attempts (Chapters 3-5); (2) there are no previously published studies or existing data this intervention technique in the region; and (3) the population's beliefs and needs have been shown to be different to those where previous PMP research has occurred (section 2.3.1). Additionally, the study will address feasibility and acceptability outcomes in small numbers, determine if modifications to the protocol are necessary, and identify how might changes in outcome could occur; before testing for efficacy in larger numbers (Bowen et al., 2009).

6.1.3 Rationale

Few non-Western studies have used education with elements of CBT to improve management of LBP disability. Only two were set in Muslim, Middle Eastern cultures (Iran) (Tavafian et al., 2007; Tavafian et al., 2011). None of the studies collected culturally-specific data to inform their management plan. Findings from this thesis have shown that some factors associated with LBP disability in Bahrain are similar to Western cultures and therefore the implementation of a PMP underpinned by concepts of CBT could improve LBP outcomes. This thesis also found some factors such as coping strategies and gender roles to vary from Bahrain to Western cultures. Taking the cultural differences into consideration could improve the feasibility and acceptability of the PMP.

6.2 Aims

The aim of this study is to determine the feasibility and acceptability of a physiotherapist-led pain management program for Arab patients with low back pain in Bahrain.

6.3 Methods

6.3.1 Ethical approval

Ethical approval was obtained from King's College London Biomedical Sciences, Dentistry, Medicine and Natural & Mathematical Sciences Research Ethics Subcommittee (BDM/13/14-45, see Appendix 17) and Bahrain Ministry of Health Ethical Approval Committee (EF/HM/1070/2014, see Appendix 18).

6.3.2 Recruitment procedure

Outpatient physiotherapy departments

Two outpatient physiotherapy departments in Bahrain agreed to participate in this study; the males' physiotherapy department at Salmaniya Medical Complex (SMC), and females' physiotherapy department from Isa Town Healthcare Centre (ITHC) (Table VI-2).

Table VI-2 Participating outpatient physiotherapy departments

Name	Type of healthcare service	Description of department and location
Salmaniya Medical Complex (SMC)	Public	Department in a teaching hospital located in the capital of Bahrain (Manama)
Isa Town Healthcare Centre (ITHC)	Public	Department in a primary healthcare centre in a suburb (Isa Town)

Participants' inclusion and exclusion criteria

Patients aged 18 years or older with back pain, with or without leg symptoms, lasting for more than three months were recruited. Participants had to have been referred by a General Practitioner (GP) or the orthopaedic team, in order to adhere to SMC and ITHC physiotherapy referral requirements. Reasons for exclusion were a diagnosis of inflammatory disease, spinal fractures or recent surgery (less than 1 year ago), or pregnancy. Participants were coded using a numerical coding system to identify them and the hospital site.

Identifying potential participants and recruitment

One female physiotherapist from ITHC (EAA) and two male physiotherapists from SMC (MJ and EAR) identified potential participants that met the eligibility criteria from their current case load with the supervision of the researcher. Eligible patients were given the information sheet (see: Appendix 19) by the physiotherapists. Potential participants were followed up by the researcher 1 to 3 days later via telephone inviting them to take part. A standard text message was sent after a maximum of 3 phone calls. The research project was explained to the potential participants and their questions were answered. Participants were informed that participation was voluntary. Participants are allowed to withdraw at any time without providing reasons. Following initial agreement, potential participants were invited to their respective outpatient department to sign informed consent (see: Appendix 20) and complete baseline outcome measures with the researcher. Participants gave their choice of preferred method of contact for confirmation (phone calls or text messages).

6.3.3 Data collection

Socio-demographic characteristics

Patients' socio-demographic characteristics, RMDQ, BBQ, CSQ, FABQ, HADS and VAS were collected. Further details are found in Chapter 4 (see4.3.3).

Roland-Morris Disability Questionnaire

Chapter 3 showed that the Modern Arabic Standard (Arabic) version of the RMDQ is simple to understand and complete, has high internal consistency and reliability, and acceptable validity to pain intensity in Arabic-speaking LBP patients (Maki et al., 2014b). Guidelines have recommended its use with LBP patients (Bombardier, 2000; Roland and Fairbank, 2000).

Back Beliefs Questionnaire

The Arabic version of the BBQ had good comprehensibility and acceptability to Arabic-speaking LBP patients, and good psychometric properties that were comparable with other BBQ versions (Maki et al., 2016, Chapter 3).

Pain Coping Strategies Questionnaire

In Chapter 3, it was found the Arabic version of the CSQ had good comprehensibility and acceptability to Arabic-speaking LBP patients. The Arabic CSQ subscales also had good psychometric properties that are comparable with other versions of the CSQ.

Fear-avoidance Beliefs Questionnaire

The Arabic version of the FABQ has been shown to have acceptable validity and reliability (Laufer et al., 2012).

Hospital Anxiety and Depression Scale

A valid Arabic version of the HADS was used (El-Rufaie and Absood, 1995; El-Rufaie and Absood, 1987).

Pain intensity on a Visual Analogue Scale

Participants are asked to indicate their "pain intensity today" on a 0-100mm horizontal line. To comply with the Arabic language, the right side of the scale was marked as "no pain" and left as "maximum pain".

Goal Attainment Scaling

Goal Attainment Scaling (GAS) is a health outcome measure which provides a patient-centered, multidimensional and individualized approach to goal setting and outcome measurement (Cox and Amsters, 2002; Kiresuk and Sherman, 1968; Zaza et al., 1999). GAS is

has been found to be a useful, valid and reliable tool for use in chronic pain settings to encourage patient involvement (Hurn et al., 2006; Williams, 1988). Participants are encouraged to choose up to four Specific, Measurable, Achievable, Realistic and Timed (SMART) goals that are meaningful to them besides physical symptoms of pain; such as issues surrounding their emotional well-being, family and friends, work, and their social environment.

At the post-intervention follow-up, they were invited to discuss the goals with the researcher and scale them on a 5-point GAS goal table. The scaling starts with placing participants baseline level, or "what participants can do today?" as -1. Level 0 is set as the minimum achievement expected by the next follow up. Levels +1 and +2 are set as somewhat better and much better than the minimum achievement expected. Inversely, level -2 is set as worse than baseline (level -1). (See: Appendix 21: Goal Attainment Scaling.)

Treatment credibility

To ascertain participant's opinion of the program, the Treatment Credibility Scale (TCS) was used (Borkovec and Nau, 1972). The TCS is a self-report, valid and reliable 5-item self-report questionnaire that measures credibility of the treatment to patients, by assessing treatment expectancy and satisfaction. Each item is scored on a 10-point Likert Scale, allowing a total of 50 points. Greater scores indicate higher treatment credibility (Borkovec and Nau, 1972; Devilly and Borkovec, 2000). (See: Appendix 22: Treatment Credibility Scale).

Treatment fidelity

Treatment integrity, an aspect of treatment fidelity measuring the degree to which the treatment was implemented in the male and female groups as intended (Borrelli, 2011) was measured. The researcher (DM), and two clinicians previously involved in generation of themes (see Chapter 5); (1) outpatients' team leader with an interest in health psychology (MJM) and (2) senior musculoskeletal physiotherapist (MJ) outlined a checklist of key concepts to be delivered by the researcher to both male and female groups. Sessions were audiotaped and audited by MJ to determine whether he agreed the researcher delivered the concept to the groups. MJ rated each session with "agree", "partially agree" or "no agreement" against the checklist.

6.3.4 Pain Management Programme

The intervention can be found in Appendix 23. An accompanying course manual in Arabic with diagrams and briefs of the discussed concepts, an exercise diary, sample exercises and stretches, and sections to record flare-up plans, goals, and reflections was given to participating patients.

Attendance

Attendance was monitored at each session and follow-up session. Participants were considered to have completed the programme if they did not miss more than 2 sessions in a row. The number of participants who attended a third of the PMP (6/9 sessions) was also calculated. Participants were considered non-completers (NC) upon either informing the researcher of their wish to withdraw from the program, or not attending two or more consecutive sessions. Participants were contacted after missing 2 or more sessions for their withdrawal reasons and at the end of the programme to fill the TCS over the phone. Participants were considered lost to follow-up (LTFU) for missing follow-up sessions. NC and participants LTFU were given a maximum of 3 phone calls over 2 days.

Follow-up

All outcome measures were collected at baseline, immediately, three and 6 months post-intervention. Participants completed the TCS at the end of the PMP. GAS goals were set at the end of the PMP and at 3 months, to be reviewed at 3 and 6 months follow-ups respectively.

Participants' feedback

At the 6 month follow-up, participants were asked to feedback up to three positive and three negative points about the program on their questionnaire packs.

6.3.5 Data Analyses

Descriptive statistics were calculated for participant socio-demographic, clinical characteristics and all outcome measures. All data analyses were carried out using SPSS version 22 (IBM UK Ltd) was used for all analyses.

Participants completed the RMDQ, BBQ, CSQ, FABQ, HADS and VAS at baseline and each follow-up session. Due to the nature of feasibility studies and its usage of a small sample of patients; results were summarised and presented as medians with ranges. The descriptive statistics were used to assess for trends of change in outcomes.

Previous findings in Chapter 4 suggested that FABQ-pa and HADS-dep explained the largest amount of variance in LBP disability with Bahraini patients. Cut-off scores are also available in the literature for both FABQ and HADS subscales. Therefore, the percentage of patients with clinically significant fear-avoidance beliefs, depression and anxiety will be assessed for change by comparing baseline to 6 months scores. Scores > 14 will be used for FABQ-pa (Burton et al., 1999), > 29 for FABQ-w (Fritz and George, 2002), and >8 for HADS-anx and HADS-dep (Zigmond and Snaith, 1986).

Attendance

Socio-demographic data, clinical characteristics and outcome measures were compared between NC the rest of the participants. Independent sample T-tests were used to compare the means between categorical and continuous variables. Chi-square and Fisher's exact test was used to compare means of categorical variables. Yates' correction for continuity, which compensates for the overestimate of the chi-square value when used with a 2 by 2 table, was used to determine the differences grouped by gender.

Goal attainment scaling

Histograms were illustrated to visually assess the number of GAS goals that have improved (score ≥0), remained the same (score= -1) or got worse (score ≤ -2).

Treatment credibility

Mean and standard deviations were calculated for the treatment credibility scale. A mean of 5 points was pre-determined cut-off for credibility (items 1 and 2) and acceptability (items 1-5) based on Pincus et al., (2013) recommendations. Independent sample T-tests were used to compare the total score means of NC and the rest of the sample.

Treatment fidelity

The proportion of observed agreement between the rater (MJ) scores was calculated to determine similarities between the male and female groups. The proportion of observed agreement was recalculated using 3x3 linear weights. The 3x3 linear weighted Kappa statistic was calculated weights assume that there is a smaller difference of 1 point in either direction of the scale; therefore it was weighted at 0.5 and 0 for a difference of 2 points in either direction of the scale. Proportion of agreement observed values of ≥0.80 were considered high, 0.61–0.80 to be acceptable, 0.41–0.6 moderate agreement and 0.21–0.4 fair agreement (Fitzpatrick et al., 1998).

Criteria for the success of the feasibility study

To determine the success of the feasibility study, the following criteria were set:

1. To have 60% of recruited participants complete the programme,
   (based on previous studies (Cardosa et al., 2012; Kitahara et al., 2006; Woby et al., 2004) and see 6.3.4 *Attendance*);
2. To have 60% of completers attend all follow-up sessions (Akel et al., 2012; McLean et al., 2010); and
   To achieve a mean of 5 points for credibility and acceptability based on Pincus et al., (2013) recommendations, see 6.3.5 *Treatment credibility.*

6.4 Results

6.4.1 Participants

Recruitment

Figure VI-1 shows participants' recruitment and attendance to the PMP over a period of 5 weeks. Physiotherapists identified 42 female and 31 male participants from that meet the inclusion and exclusion criteria.

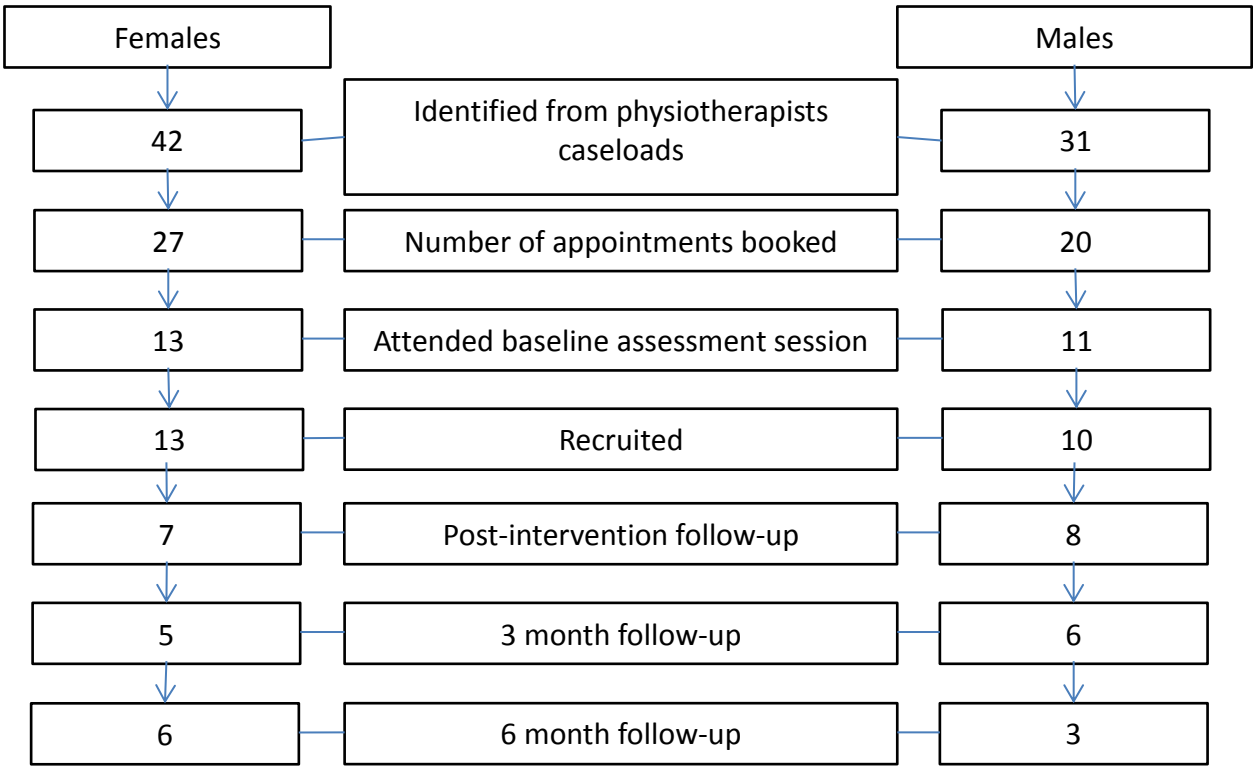

Figure VI-1 Recruitment and attendance

Table VI-3 shows reasons why potential participants could not attend baseline assessment. Twenty-seven females and 20 males had appointments, 13 and 11 respectively attended. Upon assessment, 1 male participant was excluded for ongoing investigations to rule out malignancy. Based on this recruitment experience, it is estimated that 2.6 females and 2 males would be recruited per week in for future trials.

Table VI-3 Reasons participants were not able to attend for baseline assessment

Reasons	**Female (15)**	**Males (10)**
Incomplete or wrong contact details	1	5
No transport	2	0
Unable to get hold of patient	0	2
Unable to commit to the programme	10 No transport (2) Work (6) Childcare (2)	4 Work (3) Carer for his mother (1)

Participants' characteristics

Twenty-three participants (13 female, 10 males) with a mean (SD) age of 43.35 (11.12) were recruited. Table VI-4 describes participants' characteristics. Most participants were married (87.0%) and had secondary schooling (43.5%). Duration of LBP was 2 years in 21.7% of the sample followed by 4-5 years and 6-10 years at 17.0% each.

Table VI-4 Participants' demographic and clinical characteristics

Characteristics		n =	Percentage (%)
Age	Mean (SD)		
	43.35 (11.12)	23	
Sex	Female	13	10
Marital status	Single	2	8.7
	Married	20	87.0
	Widowed	1	4.3
Education level	Elementary school	1	4.3
	Secondary school	10	43.5
	Graduate diploma	6	26.1
	Undergraduate education	4	17.4
	Postgraduate qualification (or equivalent)	2	8.7
Work status	Civil servants	1	4.3
	Engineering and construction	2	8.7
	Housewife	7	30.4
	Retired	2	8.7
	Self-employed and private business owners	1	8.7
	Student	1	8.7
	Teaching and education	5	21.7
	Unemployed	1	4.3
Duration of low back pain	3 - 6 months	1	4.3
	7 months - 1 year	3	13.0
	2 years	5	21.7
	3 years	3	13.0
	4 - 5 years	4	17.4
	6 - 10 years	4	17.4
	11 - 15 years	2	8.7
	20 years or more	1	4.3

Characteristics	n =	n =	Percentage (%)
Reason for low back pain	Gradual onset	4	17.4
	Being overweight	1	4.3
	Carrying a heavy load	5	21.7
	Work-related injury or accident	1	4.3
	Multiple reasons selected	7	30.4
	Not sure	3	13.0
	Other reason(s)	2	8.7

n: number of participants; SD: standard deviation.

At baseline, participants LBP disability measured by the RMDQ mean (SD) = 10.48 (4.49), and pain intensity on the VAS mean (SD) = 5.02 (2.73). All outcome measures are shown in Table VI-5.

Table VI-5 Outcome measures at baseline

Outcome measure	Mean	SD
RMDQ	10.48	4.49
VAS	5.02	2.73
BBQ	43.57	6.54
DA	16.39	6.87
RPS	10.74	8.46
CAT	13.96	6.94
IP	17.96	7.61
PH	27.26	5.22
CSS	25.17	8.25
IBA	20.13	7.33
COP	3.30	1.15
ADP	3.04	1.49
FABQ-pa	16.13	5.96
FABQ-w	22.52	11.96
HADS-anx	6.43	3.60
HADS-dep	7.87	4.64

SD: Standard deviation. BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

Non-completers

Seven participants did not complete the PMP, 5 of which were females. Therefore, 69.6% (16 participants) completed the PMP. The tables below contain a summary of participants' reasons for not completing the PMP (Table VI-6), and their characteristics (Table VI-7).

Table VI-6 Participants' reasons for non-completion

Reasons	Females (5)	Males (2)
Felt the programme was not appropriate	Tailored for older women and housewives (1) Does not offer electrotherapy (1)	
Change in pain levels	Pain increased and cannot drive (2) Pain increased cannot leave the house (1)	No pain at the moment (1)
Other commitments		Friend was in a severe road traffic and he had to help (1)

Table VI-7 Demographic and clinical characteristics of non-completers

Characteristics		n =	Percentage (%)	Fisher's exact test
Age	Mean (SD)			
	35.71 (13.59)	7		-2.46(21)*
Sex	Female	5	71.4	0.25[¥]
Marital status	Single	2	28.6	
	Married	5	71.4	4.40
Education	Elementary school	1	14.3	
level	Secondary school	4	57.1	
	Undergraduate education	2	28.6	6.36
Work status	Housewife	2	28.6	
	Self-employed and private	2	28.6	
	Student	1	14.3	
	Teaching and education	1	14.3	
	Unemployed	1	14.3	10.04
Duration of	2 years	2	28.6	
low back pain	3 years	1	14.3	
	4 - 5 years	3	42.9	
	11 - 15 years	1	14.3	7.72
Reason for	Gradual onset	1	14.3	
low back pain	Carrying a heavy load	1	14.3	
	Multiple reasons selected	4	57.1	
	Other reason(s)	1	14.3	5.02

SD: standard deviation; t(df): T-test statistic (degrees of freedom); [¥]Chi-squared test with Yates' correction for continuity; * $p \leq 0.05$.

There were no differences in gender, marital status, educational level, work status, length of LBP symptoms or reasons for having LBP (Table VI-7). NC had a significantly younger than participants who completed the program; respective mean age (SD) = 35.71 (13.59), 47.94 (9.71) p= 0.02. There were no differences in LBP disability at baseline, or other outcome measures. Table VI-8 shows a summary.

Table VI-8 Comparison of outcomes between non-completers and the rest of the sample

		n=	Mean	SD	t (df)
RMDQ	NC	7	12.71	3.55	1.64 (21)
		16	9.50	4.59	
VAS	NC	7	4.41	3.01	-0.70 (21)
		16	5.28	2.66	
BBQ	NC	7	24.14	7.31	-0.07(21)
		16	24.31	4.69	
DA	NC	7	14.29	2.43	-1.38 (19.80)$^{\neq}$
		16	17.31	7.99	
RPS	NC	7	9.57	7.57	-0.43 (21)
		16	11.25	9.01	
CAT	NC	7	13.57	8.06	-0.17 (21)
		16	14.13	6.682	
IP	NC	7	18.29	5.85	0.13 (21)
		16	17.81	8.43	
PH	NC	7	28.71	5.94	0.88 (21)
		16	26.63	4.95	
CSS	NC	7	24.71	5.47	-0.17 (21)
		16	25.38	9.37	
IBA	NC	7	20.71	6.42	0.25 (21)
		16	19.88	7.88	
COP	NC	7	3.71	1.25	1.14 (21)
		16	3.13	1.09	
ADP	NC	7	3.86	1.46	1.82 (21)
		16	2.69	1.40	
FABQ-pa	NC	7	15.29	7.30	-0.44 (21)
		16	16.50	5.51	

		n=	Mean	SD	t (df)
FABQ-w	NC	7	22.71	10.34	0.05 (21)
		16	22.44	12.93	
HADS-dep	NC	7	4.43	2.76	-1.86 (21)
		16	7.31	3.64	
HADS-anx	NC	7	6.57	3.55	-0.88 (21)
		16	8.44	5.03	

[≠]corrected significance level as data violates the assumption of equal variance. Levene's Test for Equality of Variances $p < 0.05$; SD: standard deviation; t(df): T-test statistic (degrees of freedom); NC: non-completers; SD: standard deviation. BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

Attendance and loss to follow-up

At 6 months, 9 of the 23 participants completed the programme and attended all three follow-up sessions (39.1%). Sixteen participants (69.6%) completed the three-week program. Thirteen of them attended 6 or more sessions. The 3 who attended less than 2/3rds of the program were 1 female and 2 male. From the 16 participants at 3 months, complete data was available from 11 participants (68.8%), 1 (6.3%) LTFU and 3 (18.8%) completed the RMDQ and BBQ over the phone with the researcher. From the remaining 15 participants at 6 months, complete data was available from 9 participants (56.3%), 5 (31.3%) LTFU and 1 (6.3%) completed outcome measures over the phone. Table VI-9 shows reasons why participants were not able to attend follow-up sessions.

Table VI-9 Reasons participants were not able to follow-ups

Follow-up	Participants	Attended follow-up session	Reasons for not attending
Post-intervention	16	15	Went on holiday (1F)
3 months	16	11 3 of which were phone follow-ups	No transport (1M) Unable to get hold of patient (1M) Busy with work (2F) Lack of childcare (1F)
6 months	15	9 1 of which was phone follow-up	Unable to get hold of patient (1M, 2F) Busy with postgraduate studies (1M) Family commitments (1M) Busy with work (1M)

F: female; M: Male

Participants' feedback about the PMP

Participants' feedback at the 6 month follow-up was tabulated (Table VI-10Table VI-10). Patients' positive feedback included remarks about the content (exercises and information), improved coping, the availability of follow-up sessions and good rapport with the researcher. Negative feedback included remarks about attendance frequency and timings, length of the questionnaires, and difficulties in making changes and coping.

Table VI-10 Participants' feedback at 6 months

Positives	Negatives
Attendance reminders (1) Exercise ideas (3) Feeling positive (1) Follow-up sessions (2) Improved their coping ability (2) Information and learning (2) Relationship with the researcher (2)	Attendance; timing (2), prefers phone follow-ups (1), limited contact between follow-ups (2) Difficult to make behaviours changes (1) Having to cope with LBP (1) Length of questionnaires (2) Not sure how to deal with "new" pain (1) Treatment should be individualized or patients need to be further "sub-grouped" (1) Unsure if there was a change or improvement in pain (1) Worried to exercise during painful periods (1)
Unable to give a positive (1)	Unable to give a negative (1)
Other	
able to cope, until an incorrect posture causes pain (1) even if the program will not work, it has no negatives or side effects (1)	

6.4.2 Participants' scores overtime

Medians and ranges describing participants' scores showed that the majority of outcomes (9/16) improved post-intervention and at 3 months follow-up (Table VI-11). At 6 months, RMDQ, DA, RPS, CSS, and FABQ-w scores indicated better outcomes. VAS, CAT, HADS-dep and HADS-anx scores indicated most favourable outcomes at 3 months. The median score and ranges of BBQ; and IP, PH, IBA, COP, ADP strategies of the CSQ did not show any trends for change. Scores for CAT were higher at 6 months compared to a drop in the use of this strategy at 3 months. Interestingly, the range of FABQ-pa scores, which were most favourable at 3 months similarly to CAT, increased by 6 months. Scores for HADS-anx and HADS-dep at 6 months show similar results to baseline, compared with improved median scores at 3 months. Increased scores at 6 months indicated that at 6 months participants were more likely to catastrophize, have higher FABs about physical activity compared to 3 months; and similar anxiety and depression levels compared to baseline.

Table VI-11 Participants' scores overtime

	Baseline n= 23		Post-intervention n= 15		Three month follow-up n= 11		Six month follow-up n= 9	
	Median	**Range**	**Median**	**Range**	**Median**	**Range**	**Median**	**Range**
RMDQ	10	2-19	8	2-16	6	2-17	5.5	0-12
VAS	4.7	0.5-9.7	3.7	1.2-7.6	3.3	1.4-6.5	5.2	0.9-8.2
BBQ	25	13-36	31	22-38	28	19-36	29	23-36
DA	15	0-34	22	7-32	19	13-33	19	10-33
RPS	10	0-30	15	3-27	10	0-21	15	4-22
CAT	12	4-28	15	5-25	8	3-22	19	8-21
IP	18	0-30	16	5-25	17	6-26	14	8-21
PH	29	18-34	24	13-36	22	15-36	27	20-33
CSS	27	7-36	23	15-36	24	14-36	23	18-30
IBA	20	9-34	20	10-32	17	6-26	20	15-25
COP	3	0-6	4	1-6	4	2-6	3	2-5
ADP	3	0-6	3	3-6	3	3-6	3	2-5
FABQ-pa	18	0-24	15	6-23	14	6-24	18	12-24
FABQ-w	23	0-42	20	3-33	19	4-27	19	6-30
HADS-anx	8	0-19	6	0-17	4	0-14	6	1-18
HADS-dep	7	0-12	6	0-13	3	0-11	8	1-10

n: number of participants. BBQ: Back Beliefs Questionnaire; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale; Pain Coping Strategies Questionnaire Subscales: DA: Diverting Attention; RPS: Reinterpreting Pain Sensations; CAT: Catastrophising; IP: Ignoring Pain Sensations; PH: Praying and Hoping; CSS: Coping Self-statements; IBA: Increasing Behavioural Activity; COP: Control Over Pain; ADP: Ability to Decrease Pain; RMDQ: Roland-Morris Disability Questionnaire; VAS: Visual Analogue Scale for pain intensity.

Table VI-12 shows the number and percentage of patients expected to have had clinically significant fear-avoidance beliefs, anxiety and depression at baseline at 6 months follow up. The assessment shows that the percentage of patients with clinically significant fear-avoidance beliefs about physical activity, anxiety and depression at 6 months was higher than the percentage calculated for baseline scores.

Table VI-12 Percentage of patients with clinically significant fear-avoidance beliefs, anxiety and depression

	Baseline n= 23			Six month follow-up n= 9		
	/ 23	**Range**	**Percentage (%)**	**/ 9**	**Range**	**Percentage (%)**
FABQ-pa > 14	15	16-24	65.2	8	15-24	88.9
FABQ-w > 29	6	30-42	26.1	1	30	1.1
HADS-anx > 8	6	9-12	30.4	3	9-18	33.3
HADS-dep > 8	7	9-19	26.1	3	9-10	33.3

n: number of participants; FABQ: Fear-avoidance Beliefs Questionnaire; FABQ-pa: physical activity subscale; FABQ-w: work subscale; HADS: Hospital Anxiety and Depression Scale; anx: Anxiety subscale, dep: Depression subscale.

6.4.3 Goal attainment scaling

Post-intervention to three month follow-up

Fifteen participants set a total of 33 goals at the end of the intervention. Participants reported improvement in 17 goals (scores ≥0). There was no improvement in 7 goals (score= -1) and outcome was worse than expected for 9 goals (score= -2). See Figure VI-2.

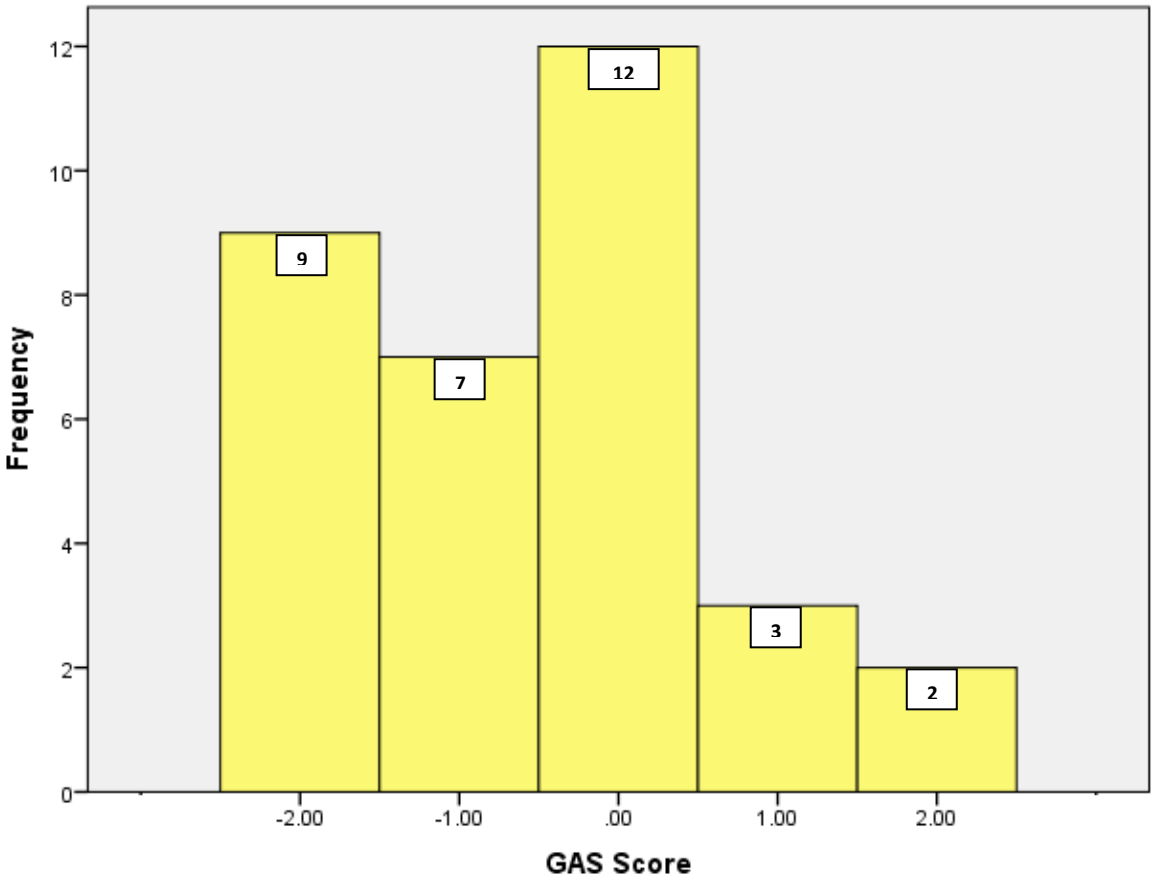

Figure VI-2 GAS goal and scores at 3 months follow-up

Three to six months follow-up

At the 3 month follow-up, 11 participants set a total of 17 goals. Participants reported improvement in 11 goals (scores ≥0). There was no improvement in 3 goals (score= 3) and outcome was worse than expected for 3 goals (score= -2). See Figure VI-3.

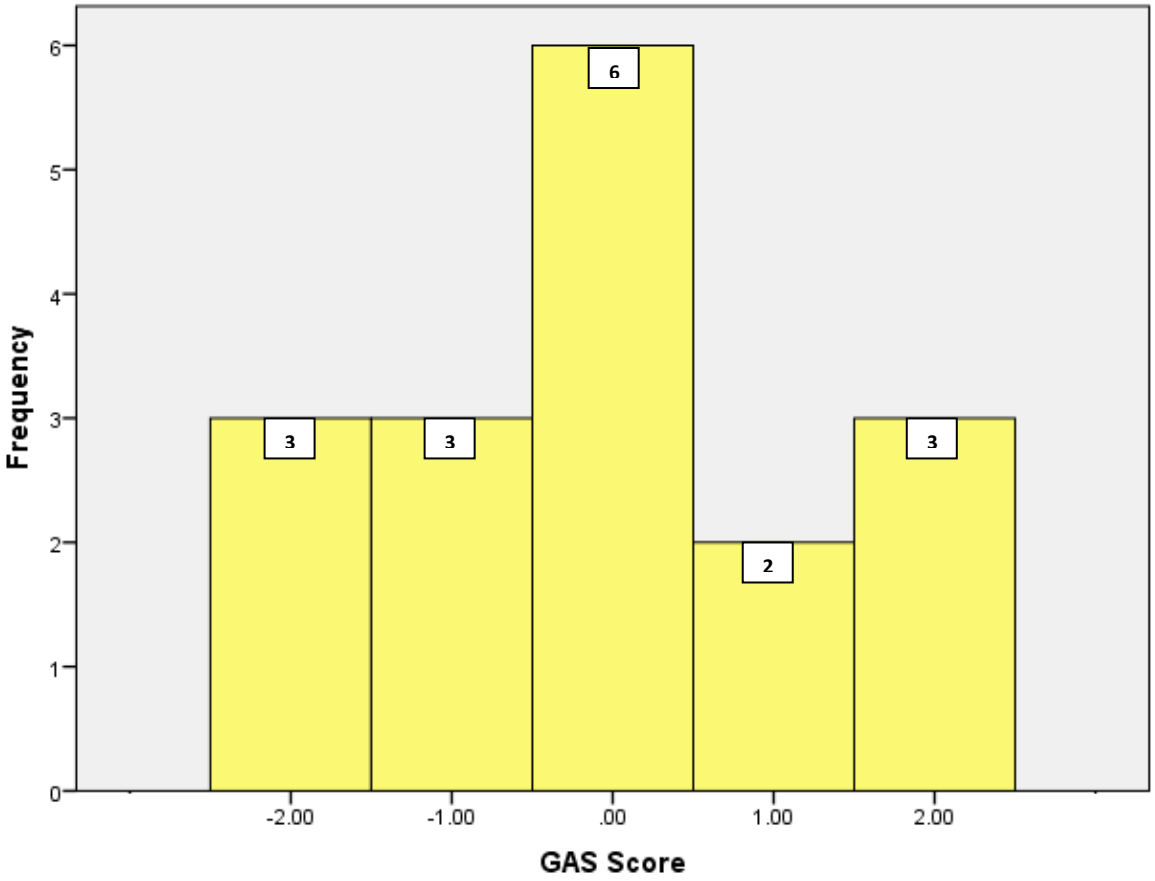

Figure VI-3 GAS goals and scores at 6 months follow-up

6.4.4 Treatment credibility

TCS were obtained from all participants who completed the program and 5 NCs (2 female participants did not wish to participate). Means (Table VI-13) of items 1 and 2, and 1 to 5 were above the 5 point cut-off score respectively indicating credibility and acceptability of the intervention.

Table VI-13 Mean and standard deviation of items on the treatment credibility scale

	Mean	SD
TCS 1	7.86	1.88
TCS 2	6.38	1.72
TCS 3	7.95	2.40
TCS 4	7.76	2.14
TCS 5	8.00	2.17

TCS: treatment credibility scale; SD: standard deviation

TCS mean (SD)= 37.95 (8.23). There was significant difference between NC and the rest of the sample (Table VI-14Table VI-14).

Table VI-14 Total treatment credibility scale scores of non-completers compared to rest of the sample

		n=	Mean	SD	t (df)
TCS		21	37.95	8.23	
TCS	NC	5	28.20	6.61	-4.03 (19) **
		16	41.00	6.09	

n: number of participatns; SD: standard deviation; t(df): t statistic (degrees of freedom); TCS: treatment credibility scale. ** $p \leq 0.001$.

6.4.5 Treatment fidelity

The rater (MJ) did not rate any sessions as not in agreement with the planned concepts to be delivered (Table VI-15Table VI-15). The female group had 6 “agreements” and 3 “partial agreements” with the criteria outlined in the checklist. The male group had 3 “agreements” and 6 “partial agreements”.

Table VI-15 Ratings for each group session

Session	1	2	3	4	5	6	7	8	9
Female	A	A	A	P	A	A	P	P	A
Male	A	A	P	P	P	P	P	P	A

A: agree, P: partially agree

There was acceptable proportion of agreement observed at 0.67. Using linear weights, the proportion of agreement observed was high at 0.83. Overall, results show acceptable to high similarity of the delivery of the intervention to both groups (Fitzpatrick et al., 1998).

6.5 Discussion

6.5.1 Summary of findings

Thirteen females and 10 males were recruited to attend a 9 session PMP over 3 weeks. Sixteen participants completed the programme, 15 of whom completed the post-intervention outcome measures. At 3 months, 11 participants attended their follow-ups and 3 participants completed the RMDQ and BBQ over the phone. At 6 months, 9 participants attended their follow ups, and 1 participant provided data over the phone. Reasons for missing follow-up sessions included reports of being occupied with other commitments such as work, study or family commitments. The majority of outcomes improved post-intervention and at 3 months. At 6 months, LBP disability; strategies to divert attention, reinterpret pain sensations, use coping self-statements; and fear-avoidance beliefs about work indicated better outcomes. However at 6 months, scores indicated higher catastrophizing and fear-avoidance beliefs about physical activity compared to 3 months; and higher anxiety and depression levels compared to baseline. Participants struggled with goal setting for their 3 and 6 month follow-ups; however self-reported improvement was observed in the majority of set goals. Results of the treatment credibility scale indicated good credibility and acceptability of the intervention as scored by all participants completing the programme and 5 (out of 7) who did not complete the programme. The study attempted to measure one aspect of treatment fidelity (treatment integrity) and showed that there was acceptable to high agreement in the delivery of the PMP to both groups. However it is important to acknowledge that only one rater, who is newly introduced to the principles of PMP assessed the audio recordings. A checklist was drawn *a priori* with the researcher and another clinician to reduce the effects of this bias.

In summary, only two of the three feasibility criteria were met;

1. More than 60% of the patients completed the programme.

2. Less than 60% of the completing patients attended all follow-up sessions.
3. Results of the treatment credibility scale indicated good credibility and acceptability of the intervention according to pre-set criteria.

6.5.2 Participants and recruitment

Participants' scores overtime

Although there was a tendency towards improvement in most outcome measures including LBP disability at 6 months, there was an increase in catastrophizing, fear-avoidance beliefs about physical activity anxiety and depression at 6 months. Most favourable outcomes were seen immediately post-intervention and at 3 months. It is important to note that data at 6 months was only collected from 9 participants. Therefore, the high attrition rates could have biased these findings; participants who were more likely to catastrophize, have fear-avoidance beliefs, anxiety and depression about their pain may have been more likely to attend their follow-up appointments. The 9 participants did have less LBP disability compared to baseline. The percentages of patients with clinically significant fear-avoidance beliefs about physical activity, anxiety and depression were larger in patients attending their 6 month follow-up compared to baseline. Attendance could be for further reassurance or requests for further contact with healthcare professionals. Studies have often found that not only greater levels of disability (Ferreira et al., 2010) were predictive of seeking treatment; but also anxiety, depression and higher levels of fear-avoidance beliefs (Keeley et al., 2008; Waxman et al., 1998). This sample of patients does show that negative coping strategies, higher levels of fear-avoidance, anxiety or depression were more likely to return to healthcare professionals.

Recruitment

The recruitment process allowed for calculation of a recruitment rate to aid with recruitment in future studies. The study had 7 (30.4%) NC. NC were significantly younger than the rest of the sample ($p= 0.02$) and scored lower on the TCS ($p= 0.001$). Glombiewski et al., (2010) studied factors associated with dropouts from outpatient CBT for LBP. Similarly, younger patients and lower treatment satisfaction in the first few sessions predicted treatment non-completion. Additionally, lower levels of depression in LBP patients predicted termination of treatment (Glombiewski et al., 2010). This was not a finding this feasibility study. This could potentially be due to the small sample size of the feasibility study. Additionally, the study did not collect data from NC or patients LTFU making it is difficult to speculate on differences in anxiety and depression outcomes. There has been limited research on attrition rates from CBT-informed PMP for low back pain. Glombiewski et al., (2010) report that most of the psychological literature shows 30-50% attrition rates compared to up to 30% from seven CBT-

informed LBP PMP. They suggest that although CBT-informed interventions for LBP are comparable with psychological treatments of disorders like depression, it is important to note that patients might not be. The comorbidities and aetiologies of the both disorders vary considerably amongst these patients. However seeing as a comparable approach is effective in managing LBP, they found it was a starting point to examine similar variables in the literature.

Other non-Western PMPs show similar rates of 25.3% (Kitahara et al., 2006) and 30% (Cardosa et al., 2012). Although both studies showed a reduction in disability using elements of education and CBT, both studied mixed chronic pain populations. Other studies specifically targeting LBP in non-Western settings had lower dropout rates between 2.7% to 17.4% (Luk et al., 2010; Sahin et al., 2011; Yang et al., 2010), however a British study by Woby et al., (2004) found 31% dropout rate before the completion of the study. Changes in pain levels have been found to be reasons for low adherence to treatment at outpatient physiotherapy clinics (Jack et al., 2010), particularly increase in pain which was found in 3 of the 5 NC females. However, a non-linear trend was found for pain, where patients with low levels of pain can also terminate treatment, as seen with 1 of the 2 male patients who reported a decrease in his current levels of pain (Glombiewski et al., 2010). Overall, this shows that the proportion of NC is similar to other studies. Although there is limited research on attrition in PMP with elements of CBT for LBP, reasons for attrition in this feasibility study have been similar to other findings.

Attendance

Of the 16 participants who completed the program, 13 (81.3%) attended more than 2/3rds of the program (≥6 of 9 sessions). Middleton et al., (2004) found evidence that physiotherapy interventions with elements of CBT were more effective at improving attendance to outpatient physiotherapy services. Results were based on one study deemed to be of high quality, out of 5 studies addressing this aspect. In addition to this limitation, the results of this feasibility study cannot be compared to attendance rates of conventional physiotherapy sessions in Bahrain as this data is not available. Attendance and adherence to treatment could also be explained by other psychological models which were beyond the scope of this feasibility study. For example, the Transtheoretical Model (Stages of Change) which identifies five stages of behaviour change (pre-contemplation, contemplation, preparation, action, and maintenance) are used to facilitate behaviour change (Glombiewski et al., 2010; Middleton, 2004).

Attrition rates

Only 9 of the 23 participants (39.1%) remained in the program at 6 months follow-up. Attrition rates are typically higher in studies using non-medical interventions (Akl et al., 2012). Compliance was also seen to be low from feedback on self-reported GAS measures. More than

half of the goals at 3 and 6/12 follow up remained at baseline, or worse. Reasons for a low retention rate could be similar to adherence issues. Participants were not assessed for readiness to change. Additionally, other psychological constructs that could affect adherence to treatment, attendance to the program and follow-up and compliance with goals such as locus of control and self-efficacy were not measured in this feasibility study. They have been shown to affect adherence and compliance to treatment (Beinart et al., 2013; Middleton, 2004). Anticipating barriers to adherence and planning for them may also improve adherence (Critchley et al., 2015).

Attrition rates of < 20% on short-term follow-up or < 30% on long-term follow-up (e.g. 1 year) have been considered acceptable in research (McLean et al., 2010). The implications of higher attrition rates need to be acknowledged when planning for future studies. The reduced sample size could affect the power of a study to detect a hypothesised difference. Attrition can also introduce a form of selection bias and reduce generalisability of findings, since loss to follow-up is rarely a truly random event (Dumville et al., 2006; Fewtrell et al., 2008), suggesting that the likeliness of positively biased findings (Glombiewski et al., 2010). A realistic scenario would be; patients who perceive themselves to deteriorate or not improve may fail to return (Akl et al., 2012). Although efforts are made to reduce this bias by presenting baseline data, and assessing for differences between completers and NC, it can be difficult to assess for unknown variables when participants are expected not to be missing at random. Efforts have been made to follow-up NC and participants LTFU, however it is recognised that this area of research is difficult to explore and is not well understood (Akl et al., 2012).

Although 2 of the 3 criteria set for the success of the feasibility criteria were achieved, attendance and retention rates were low. Low retention rates call for the revision and improvement of the intervention. For example, changes in selection criteria and as described above (assess for readiness to change), or the assessment of other variables that could explain adherence such as locus of control and self-efficacy could be incorporated.

6.5.3 Limitations

There are several limitations to the design of this feasibility study that need to be acknowledged before making recommendations for a future pilot study. This feasibility study only assessed acceptability from the patients' point of view. The intervention was delivered by the researcher and not the local physiotherapists and their points of view were not formally taken into account. Their experiences and views are important to take into consideration to implement this intervention in practice. The feasibility outcomes were assessed in the short to medium term. Therefore outcomes and attrition rates at long-term follow up, for example at

one year, remain unknown. Glombiewski et al., (2010) suggest that *a priori* criteria should distinguish between withdrawal at early and late treatment and during follow-up periods to help researchers assess and understand reasons for attrition at different phases of the trial. Although efforts were made to contact participants who did not complete the intervention, participants were not formally interviewed at 3 and 6 months to determine reasons for non-attendance and not achieving their goals. They informally reported that they did not have time, or forgot to pursue their goals.

Although results of the TCS suggest that the PMP was acceptable and credible, and most outcome measures showed improvement at 3 months; it is difficult to determine whether participants felt better; reasons for higher catastrophizing, fear-avoidance beliefs about physical activity, depression and anxiety levels at 6 months; and struggles with goal setting. The participants were invited to give general feedback about the programme (see Table VI-10) and to report on their perceived improvement with pre-set goals however, they were not asked a structured question to reflect on their perceived overall improvement, nor where they formally interviewed to discuss their participation in-depth. It has been speculated that reasons such the inclusion and exclusion criteria or the frequency of the sessions per week might have affected attendance and attrition rates. Formal interviews with a sample of participants who completed the programme, NC and LTFU limited attempts speculate over reasons for low attendance, high attrition rates, and no changes in coping strategies in addition to the scores that increased at 6 months (mentioned above). However, it is acknowledged that attrition rates were high and could have biased the results and scores at 6 months. Therefore, modifications to improve the programme are suggested in section 6.5.4.

The study did not intend on specifically measuring physical activity levels, or return to activities or work specifically. GAS goals were used to allow patients to set patient-specific outcomes and be measured against them; of which it was expected patients would set goals related to work and activity. It has been acknowledged that patients struggled to identify and achieve their goals, although they did report some improvement in the majority of the set goals. Therefore, it is recommended that future studies measure such clinical factors specifically in conjunction to setting patient-specific outcomes. Other possible mechanisms of change such as self-efficacy or acceptance were not measured during this feasibility study, due to the lack of availability of an appropriate outcome measure in Arabic. It is recommended that these are measured in future larger trials, using valid and reliable translated and cross-culturally translated tools to possibly identify mechanisms of change. It is recommended that self-efficacy is measured in future larger trials, using valid and reliable translated and cross-culturally translated tools to possibly identify mechanisms of change.

6.5.4 Suggested modifications to the intervention

With the results of the feasibility study and the limitations in mind, a few suggestions can be taken into consideration to assist the implementation of the intervention into practice. For example, although local physiotherapists were not delivering the intervention, they delivered other group-based interventions for other musculoskeletal conditions that could be learnt from. Most group-based treatment programs at ITHC and SMC were conducted over 2 sessions a week for periods of 4 to 6 weeks. It is reasonable to consider delivering this 9 session intervention twice a week over a period of 4 to 5 weeks. In this instance, the 9 sessions were delivered over 3 weeks for two reasons; the former being a pragmatic reason. Ramadan was approaching and both participants and the physiotherapy departments were keen on completing the intervention before the start of this religious month. Secondly, participants in a previous chapter (5) believed that frequent physiotherapy sessions were more beneficial. In retrospect, spacing the 9 sessions over 4 to 5 weeks could allow patients time to comprehend and reflect on concepts between sessions, particularly when goal setting is introduced in session 6. However, it is important to consider that longer periods may need more commitment and have larger attrition rates.

Although only formally reported as a negative point by two participants (Table VI-10, under 6.4.1), participants often felt isolated between follow-ups. The use of a booster phone call (Critchley et al., 2015; Fleig et al., 2013) or other form of electronic communication (such as text messages or emails) could be useful to support patients and remind them about their goals. Patients often reported that they started reconsidering their goals about 10 days or a fortnight prior to their follow-ups with the researcher, or when the researcher contacted them to confirm their follow-up session. There was limited success of collecting key outcome measures over the phone in this feasibility study. A total of 4 participants at both follow-ups responded to follow-up phone calls. However, when participants responded it was found that the RMDQ and BBQ were easy to administer over the phone. Participants preferred and responded well to electronic forms of communication throughout this study, therefore it is possible to consider asking participants to fill out the outcome measures electronically and dedicate the follow-up sessions to answer their concerns and focus on overcoming barriers to achieving their goals.

Informally, participants positively reported improvement in coping abilities, and an increase in LBP knowledge, however as discussed previously there was no improvement or deterioration in more than half of the goals set for 3 and 6 months. One participant feedback that it was difficult to make behavioural changes, but it was noticeable that participants struggled to set goals at 3 months to be reviewed at their final follow-up session. Studies have found that

success in living according to personal values was associated to a reduction in disability, depression and pain-related anxiety (McCracken and Yang, 2006). Therefore, goal setting can be improved by setting value-based goals; where goals are related something important, or *valued* by the patient and then setting a realistic, workable and achievable plan to achieve it (McCracken and Morley, 2014; McCracken and Yang, 2006). For example, participants who value family would be more likely to work towards a goal that involves "playing with / carrying my child" rather than "do my exercises 3 times a week".

6.6 Concluding on the acceptability and feasibility of the intervention

6.6.1 Acceptability

All participants completing the TCS showed that the intervention was acceptable and credible. Participants also gave good feedback on the intervention. Several participants found they had learned new information about exercise, and LBP and a few reported trying to cope. Goal setting and goal attainment has had limited success, therefore the concept of goal setting was probably not accepted by these patients. Value-based goal setting has been suggested as a method of improving acceptability (McCracken and Morley, 2014; McCracken and Yang, 2006).

6.6.2 Feasibility

The PMP was manageable to organize and was welcomed by physiotherapists to run adjacent to other physiotherapy services. The recruitment rate was acceptable for a feasibility study; however high attrition rates will have implications for future studies as discussed earlier. An increase in recruitment will only introduce a bias towards positive findings if it is assumed that participants who do not feel the benefits are likely to discontinue their participation in the study. Therefore, changes have been suggested to improve feasibility and practical issues, such as spreading the 9 sessions over 4 to 5 weeks. Nevertheless, feasibility aspects of training local physiotherapists to implement and run the intervention are yet to be explored.

6.7 Chapter summary

Findings from this thesis were used to inform a physiotherapist-led PMP for Bahraini patients with LBP. Participants (13 females and 10 males) were recruited to attend a 9 session PMP over 3 weeks. Sixteen participants completed the programme, 15 of which completed the post-intervention, 11 completed the 3 months, and 9 completed the 6 months outcome measures. The majority of outcomes improved post-intervention and at 3 months. At 6 months, LBP disability; strategies to divert attention, reinterpret pain sensations, use coping

self-statements; and fear-avoidance beliefs about work indicated better outcomes. However at 6 months, scores indicated higher catastrophizing and fear-avoidance beliefs about physical activity compared to 3 months; and higher anxiety and depression levels compared to baseline. Participants struggled with goal setting for their 3 and 6 month follow-ups; however self-reported improvement was observed in the majority of set goals. Results of the treatment credibility scale indicated credibility and acceptability of the intervention. Although more than 60% of the patients completed the programme, and results of the treatment credibility scale indicated good credibility and acceptability of the intervention according to pre-set criteria; less than 60% of the completing patients attended all follow-up sessions. Low attendance rates, and high attrition rates suggest that the programme requires modifications. Modifications have been suggested; such as spacing the 9 sessions over 4 to 6 weeks, and provision of patients with electronic means to provide the research team with data to allow for more time to discuss concerns and barriers to achieving their goals.

Chapter VII: Discussion

7.1 Introduction

PMPs that prioritise the reduction of negative pain beliefs and unhelpful coping strategies, encourage return to activity and participation, and the reduction of deconditioning have shown positive changes in LBP outcomes in the Western world (Glombiewski et al., 2010; Mannion et al., 2001; Wertli et al., 2014a; Wertli et al., 2014d). Such PMPs have been developed mainly for patients with LBP lasting longer than 3 months, where the presence of the aforementioned psychosocial factors are present and have been found to predict LBP disability (see 1.4).

Recently, a few studies have explored the efficacy of PMP in the reduction of LBP disability in non-Western cultures (de Góes Salvetti et al., 2012; Sahin et al., 2011; Tavafian et al., 2011; Yang et al., 2010); however few studies acknowledge the potential impact of specific cultures on the effectiveness of these programmes (Tavafian et al., 2011), with none reporting relevant explorations into the adaptations of the programme content. Culture is likely to influence the pain experience, because it affects the language and expression of pain, cultural beliefs about pain and subsequently pain behaviour and coping methods, and individuals' relationships with family and healthcare providers (Stenberg et al., 2014). Therefore this has an impact on the development and use of outcome measures that assess for change, identifying and addressing relevant factors associated with LBP disability in the targeted culture, and provision of a culturally acceptable PMP.

The aim of this thesis was to design and then determine the feasibility and acceptability of a physiotherapist-led pain management programme for LBP patients in Bahrain. Five studies were conducted to achieve this aim. First, a systematic review of studies assessing for determinants and predictors of self-reported LBP disability in non-Western cultures. Translation and cross-cultural adaptation and psychometric testing of the self-report outcome measures, a cross-sectional survey of factors associated with LBP disability, and a qualitative exploration of beliefs and experiences of patients living with LBP were carried out in Bahrain. Results of these three studies were used to inform design of a physiotherapist-led PMP that was then tested for feasibility and acceptability.

7.2 Summary of key findings

7.2.1 A systematic review of factors associated with LBP disability in non-Western cultures

The review identified 11 cross-sectional and one retrospective cohort studies from eight countries published by December 2012. Only five studies used validated outcome measures making the usage of validated questionnaires in the targeted language the most commonly missed quality item. There were more associations studied for LBP disability and biomedical factors (such as pain characteristics, muscle strength, range, and patients' physical characteristics) than psychosocial factors (health beliefs, locus of control, coping strategies and psychological distress). Evidence was strong for fear-avoidance beliefs having a low association with LBP disability but inconclusive for predicting changes in LBP disability. Evidence was moderate for a moderate association for LBP disability with pain intensity and no association with symptom duration. Evidence was weak for moderate association with chance locus of control. These findings are similar to reviews of mainly Western studies. However, this review was limited because of the small number of studies and lack of work-related or other social factors.

7.2.2 Translation, cross-cultural adaptation and psychometric testing of self-report outcome measures

The RMDQ, BBQ, and CSQ were cross-culturally translated and adapted into Modern Standard Arabic (Arabic). Testing with Arabic-speaking LBP patients showed good comprehensibility and acceptability. Bilingual (English and Arabic-speaking LBP patients) completed the English (original) and Arabic (translated version) of the questionnaires. Results showed high overall agreement for the RMDQ and CSQ, and acceptable agreement for the BBQ English and Arabic versions. Validity and reliability testing showed the Arabic versions of the three outcome measures had high test-retest reliability and high internal consistency with the exception of the CSQ Praying and Hoping subscale. The RMDQ, BBQ and CSQ were assessed against pain intensity, FABQ and HADS (respectively) to determine construct validity. All three outcome measures had acceptable construct validity that was comparable with other language versions.

7.2.3 Determinants of self-reported LBP disability in Bahrain

Data from 199 patients with LBP in Bahrain was collected. Patterns of missing data revealed that most of the missing data was from the CSQ subscales, with 8.5% (n= 17) patients showing a third or more of their values missing. Results showed that LBP disability in Bahraini patients is associated moderately with depression, fear-avoidance beliefs about physical activity, pain intensity and back pain-related beliefs. There were low associations with fear-avoidance beliefs about work, anxiety, ability to ignore pain, and ability to decrease pain. After accounting for age, gender and pain intensity, fear-avoidance beliefs about physical activity accounted for 8.9% and 7% of the variance in the original and imputed data respectively. The contribution of depression and the ability to ignore pain was also examined after accounting for the same variable above, and they jointly accounted for 10.6% and 13.0% of the variance in the original and imputed data, respectively. Altogether, age, gender, pain intensity, back pain-related beliefs, fear-avoidance beliefs about physical activity and work, ability to ignore pain, control pain and decrease pain, depression and anxiety explained 34.7% of the variance in LBP.

7.2.4 Qualitative study of experiences and beliefs about LBP in Bahraini patients

Three same-sex focus groups (total n= 18, 14 female) were conducted. Five key themes emerged that best described participants' beliefs and experiences of LBP and expectations of the healthcare system in Bahrain. The first theme *loss of independence and change of identity causes distress* mainly explores females' distress at the loss of role. The second theme *beliefs and attitudes towards low back pain* shows patients' LBP-related beliefs such as the causes of LBP, phrases to describe their pain, and how pain and fear-avoidance beliefs affect them. Under *trying to cope*, positive coping strategies are explored. Participants found themselves dependent on healthcare professionals to legitimize their pain, and for advice and medical management, which were sub-themes discussed under *experiences within the healthcare system.* And finally, *participants' assessment of their needs* explores participants' views on improving healthcare services. Participants' thoughts on group treatment programmes were also assessed showing that they preferred same-sex treatment groups, regular sessions, and for the content to allow for education and discussion.

7.2.5 Feasibility and acceptability of a physiotherapist-led pain management program for LBP in Bahrain

Participants (13 females and 10 males) were recruited to attend a 9 session PMP over 3 weeks. Sixteen participants completed the programme, 15 of which completed the post-intervention outcome measures. At 3 months, 11 participants attended their follow-ups and 3 participants completed the RMDQ and BBQ over the phone. At 6 months, 9 participants attended their follow ups, and 1 participant provided data over the phone. Reasons for missing follow-up sessions included reports of being occupied with other commitments such as work, study or family commitments. The majority of outcomes improved post-intervention and at 3 months. At 6 months, RMDQ, VAS, BBQ, RPS, FABQ-w and HADS-dep scores indicated better outcomes. However in the case of CAT, FABQ-pa and HADS-anx, 6 month scores indicated a higher catastrophising, fear-avoidance beliefs about physical activity and higher anxiety levels. Participants reported struggling with goal setting for their 3 and 6 month follow-ups; however self-reported improvement was observed in the majority of set goals. Results of the treatment credibility scale indicated credibility and acceptability of the intervention as scored by all participants completing the programme and 5 (out of 7) who did not complete the programme. Modifications have been suggested to improve the acceptability of the intervention and reduce attrition rates; such as spacing the 9 sessions over 4 to 6 weeks, the use of a booster phone call between patients, and provision of patients with electronic means to provide the research team with data to allow for more time to discuss concerns and barriers to achieving their goals.

7.3 Comparison between Bahraini and Western patients

Results of this thesis have shown many similarities with findings from Western studies. These results advocated testing a Western-developed physiotherapist-led PMP with Bahraini LBP patients. Despite the similarities, differences between Bahraini and Western patients did emerge from this thesis. The reasons for similarities and differences between Bahraini and Western LBP patients, and implications for biopsychosocial management of LBP are discussed in this section.

The bivariate associations and model to explain the variance in LBP disability (Chapter 4) and methods of coping (Chapter 5) are similar to other findings (Chapter 1). This could be due to the use of the same outcome measures. Despite the translation and cross-cultural adaptation procedures for the RMDQ, BBQ, CSQ, FABQ and HADS in the target language (Arabic), their

design has been underpinned by experiences of Western patients and modern concepts of chronic pain. On the other hand, the similarities could suggest that LBP experiences are similar in developed countries despite differences in culture. Developed countries in the Middle East are expected to have a certain degree of Western influence; due to globally exchanged information (e.g. online medical advice), frequent reports of patients seeking healthcare abroad (Chapter 5) (Alghadir et al., 2015), and Western healthcare systems (MoH, 2010).

Deeper analysis of similarities between Bahraini and Western LBP patients has shown that concepts that portray the classic LBP experience are present with Bahraini LBP patients; however the intricacies shaping those concepts reflect cultural-specificity and are worth considering. An overview is found in Figure VII-I. With regards to disability; findings have shown culturally-specific activities could best reflect it. For example elimination of item 19 of the RMDQ (*Because of my back pain, I get dressed with help from someone else*) would have improved the psychometric properties of the ArRMDQ (see 3.2, Psychometric properties). This could mean that requesting help to dress is not reflective of disability for patients from a conservative Islamic culture (Maki et al., 2014b). On the other hand, a clear indicator of limited participation is the report from male participants limiting their visits to mosques because of the availability of comfortable seating (Chapter 5).

Low back pain disability	Limited participation in activities of daily living	Adapting prayer position from standing and kneeling to sitting
Active coping strategy	Increasing activity	Walking to local houses of worship
Passive coping strategy	Reading for distraction	Reading the Quran
Relationships with healthcare professionals	The need for sympathy and thorough examinations	Expectations and limitations of examinations carried out by healthcare professionals of the opposite sex
Access to healthcare	Lack of transport	Females restricted from driving
Expression of pain	Catastrophic expressions	Religious statements to cope or for emphasis

Figure VII-I Culturally-specific examples of concepts associated with low back pain

Results from the cross-sectional survey (Chapter 4) and the qualitative exploration (Chapter 5) show that concepts of both active and passive coping mechanisms apply to Bahraini patients.

Although active strategies (going for a walk) and passive strategies (usage of painkillers) (both Chapter 5) have been reported by other patients, certain passive strategies such as listening to prayer (Chapter 3) and active strategies such as going to the mosque for prayer (Chapter 5) are particular to this patient population. Culturally-specific coping strategies are largely due to the religiosity of Bahraini patients compared to Western patients, and the availability of activities in Bahraini societies (Benjamin and Donnelly, 2013).

Participants described similar encounters with healthcare professionals in Bahrain (Chapter 5). Similar experiences with healthcare practitioners and within the healthcare systems could be due to the predominance of Western-educated healthcare professionals (Abdulrahman, 2008). Undergraduate medical (Abdulrahman, 2008; Telmesani et al., 2011) and physiotherapy education (Alghadir et al., 2015; MacPherson et al., 2013) in the Arabian Gulf follow similar curriculums and teaching styles to universities in Western countries. Most undergraduate physiotherapy university courses are taught by a mixture of local and expatriate educators (Alghadir et al., 2015; MacPherson et al., 2013). Additionally, some doctors and most physiotherapists with post-graduate qualifications have been financially supported by their governments to train and obtain their degrees from the United Kingdom or United States of America (Alghadir et al., 2015; MacPherson et al., 2013; Telmesani et al., 2011). The comparable experiences included culturally-specific details. For example, both Bahraini and Western LBP patients expect sympathy and thorough examinations from clinicians. One female (Chapter 5) describes the importance of removal of her abaya for a thorough examination by a male clinician. Readers might expect that patients are not in favour of consultations with members of the opposite sex. However, this shows that patients expect clinicians to communicate and obtain consent to examine patients undressed.

Participants reported reasons for non-completion of the PMP or LTFU; such as pain intensity, other commitments and lack of transport (Al-Eisa, 2010; Jack et al., 2010). In line with the arguments made above, it is important to further explore the details behind these reasons. Although this thesis did not further analyse these reasons, it is expected that cultural and societal factors underpinning broad reasons reported in the literature, such as the lack of transport, will differ from Western to Muslim Arab cultures. Al-Esia et al., (2010) audited reasons for females' non-adherence to physiotherapy and found that on the surface issues were similar to previous findings in the literature, however women's roles at home and their inability by law to drive should be explored to shed a deeper meaning to "lack of transport". Although women are legally allowed to drive in Bahrain, one female participant did report that her husband did not allow her to drive and therefore felt socially isolated (Chapter 5). It would be important to identify such barriers to treatment and manage them within culturally-

accepted methods. For example, patients' spouses could be included in LBP consultations and explanations, or female patients could be given appropriate home-based management plans or telephone follow-ups. Providing participants' with culturally-accepted management plans could improve their outcomes.

7.3.1 Implications for biopsychosocial management of LBP

LBP disability and factors associated with LBP disability in the West (Chapter 1) were present in Bahraini LBP patients (Chapters 4 and 5) and other non-Western cultures (Chapter 2). Findings from this thesis have identified that although concepts are similar on the surface, some details underpinning these concepts are culturally-specific. These findings have implications for pain management approaches driven by the biopsychosocial model (see: 1.1.3).

The impact of culture on the biopsychosocial model should be acknowledged in all cultures, not just Arab Islamic cultures like Bahrain. None of the identified studies that investigated the effectiveness of PMP in non-Western cultures collected culturally-specific data to inform their management plan (see 6.1.1). This shows the importance of disseminating this message. The country and culture of a patient affects all domains of the biopsychosocial model. The set of values that accompanies any given culture will affect patients' attitudes and beliefs toward LBP and its associated disability, expressions of pain and disability, and healthcare professionals and systems. Culture will influence how patients report distress, reasons for distress and the response of those around the patient to patients' distress. For example, Middle Eastern and Asian cultures may be more likely to verbalise physical pain, although they have been found to be less likely to report emotional pain and distress (Lovering, 2006). It is important to understand how culture affects gender roles, family dynamics, and expectations. In some cultures, patients' families are involved in consultations, decision-making and the management of long-term pain and/or illness (Lasch, 2000; Nasir and Abdul-Haq, 2008). Therefore there is a need to understand these concepts and integrate them appropriately within patient management plans. Work, compensation and healthcare systems will be influences by both culture and regulations within a given country. This can affect self-report disability levels, and care seeking behaviour (Genêt et al., 2009; Sanders et al., 1992).

A similar approach should be utilized for the management of LBP patients of migrant populations in non-Western cultures. Western healthcare systems have been advocates of culturally-sensitive care in recent times with rapidly growing migrant populations (Lee et al., 2006; Padela et al., 2011). Culturally-specific psychosocial factors relating to migrant populations need to be explored in addition to explorations of patients in their native countries. Migrants are likely to have different sets of beliefs and expectations. Therefore,

reasons for migration and their levels of acculturation create a whole set of ideologies that distinguish them from their native counterparts (LaFromboise et al., 1993; Landrine and Klonoff, 2004). Consequently barriers to healthcare; such as access, language and education levels may be different as well.

7.3.2 Implications for physiotherapy practice

It is recommended that physiotherapy practice incorporates the usage of *cross-cultural pain management programmes* for appropriate cultural groups. This should take into consideration the usage of validated outcome measures, modified content and culturally-competent staff. Cultural competence, understanding the norms of a culture, could improve the delivery of pain management approaches (Hodge, 2006). Although it would be difficult to match each PMP to a physiotherapist of the same ethnicity or culture; training physiotherapists for cultural competence, or the use of culturally-aware healthcare assistants or interpreters would help (Lee et al., 2006; Priestley, 2012; Sze-Mun Lee et al., 2006). Group settings can also encourage patients to interact with other like-minded patients (Hodge and Nadir, 2008). This is especially important to bridge the cultural gap between physiotherapists and patients. It is also important to consider gender issues. In certain Asian or Middle Eastern cultures such as Bahrain, patients prefer to be in same-sex groups. They reported that this would make them feel more comfortable and more willing to share their needs (Chapter 5). In addition to that, gender roles need to be considered in both one-to-one approaches and group management. In the UK, a few cross-cultural PMP have been culturally modified and offered to patients of ethnic minorities, (Millett, 2015; Priestley, 2012) but they have yet to report on effectiveness of their cultural modifications. Addressing cultural aspects of the biopsychosocial model for cross-cultural pain management approaches is expected to improve patient satisfaction and positive LBP outcomes in the long-term (Kvarén and Johansson, 2004; Snelgrove and Liossi, 2013). A culturally-modified biopsychosocial approach is also recommended to be taken for consideration for all chronic pain management approaches; this includes interventions beyond group-based interventions, and multidisciplinary pain management approaches.

7.4 Implications for LBP management in Bahrain

7.4.1 Practical aspects

Group

It is recommended that participants continue to be grouped by gender in future group based PMP. This is supported by the wish of the participants (Chapter 5), the success of patient interactions (Chapter 6) and remains in line with other group-based interventions at ITHC and SMC. It is recommended to enroll 7-8 participants per group to allow the physiotherapist to interact with patients on an individual level, and at the same time allow for group interactions and exchange of ideas.

Scheduling

It is recommended that major religious festivals are avoided such as Ramadan (Chapter 6) and Muharram (Chapter 5). Muslims also observe two Eid holidays lasting approximately three days. However, most locals would prepare in the buildup to Eid holidays, which could leave patients busy for a period of 7 to 10 days of preparations, festivities and family gatherings. Although participants would be encouraged to try and carry on with their lives and lifestyle as usual alongside the PMP, setting the PMP around religious festivities could make it difficult for patients to try and comprehend new concepts, break down tasks at home and at work, and apply other concepts they learn. If the religious calendar of events allows, it is recommended that the first 6 sessions are carried out over 2 per week, followed by a single session per week over the final three weeks. This can allow patients time to plan and apply new concepts to self-manage at home, allow them to identify barriers to self-management, and reflect on concepts of goal-settings before goals are set (sessions 7 to 9).

7.4.2 Involving patients in LBP management

Findings from this thesis show that patients with LBP in Bahrain tended to assume a passive role in their LBP management more often than an active role. This was seen from patients placing a lot of their beliefs about the long-term consequences of LBP (BBQ, Chapter 3, section 5.1.3) and coping mechanisms (CSQ, Chapter 3, section 5.1.3) on the strength of their belief in God. Results from the cross-sectional survey (Chapter 4, Table 9) show that patients were more likely to endorse PH and CSS items (both passive) compared to other types of coping strategies. Again it was seen under dependency on medical management and physiotherapy services, a small number of females accepting responsibility and prioritising their health, and

only two men reporting successful changes at work (Chapter 5). Additionally, participants reported the need for thorough examinations and improved patient-clinician rapport, however they did not report the need for joint decision-making. And finally, passivity was seen with difficulties in goal setting and goal attainment (Chapter 6). Collectively these findings highlight the need to encourage patients to take more of an active role in the management of their LBP.

An exploration of patients' satisfaction following LBP treatment from another Middle Eastern country (Egypt) showed patients' preference towards a passive role in decision-making, and great belief in the clinicians' superiority (Ali and May, 2015), similarly to this study (Chapter 5). However they found some participants reported some engagement following an explanation and encouragement from the physiotherapist. Therefore physiotherapists in Bahrain should be encouraged to motivate the patient to take an active role in their LBP management.

Healthcare professionals and especially physiotherapists' attitudes towards LBP could be a barrier to the encouragement of patient's decision making and the implementation of the PMP (Darlow et al., 2012; Daykin and Richardson, 2004; Synnott et al., 2015). This advocates the need to influence physiotherapists' beliefs to improve their management approach (Darlow et al., 2012). Physiotherapists are less confident with the absence of a diagnosis or impaired structures, may be uncomfortable with modern concepts of pain management, and may feel outside of their comfort zones learning new pain management skills (Darlow et al., 2012; Daykin and Richardson, 2004; Synnott et al., 2015). Although these findings are reported from UK and European clinical settings, physiotherapist in Bahrain are expected to share similar belief systems because as discussed earlier most undergraduate physiotherapy are based on Western curricula and physiotherapists from Bahrain and the Gulf are likely to continue their professional development in Western countries.

Physiotherapists have reported fears of patients requesting more passive and hands-on modalities upon engagement in active decision making (Synnott et al., 2015). This could make clinicians more likely to revert to such treatment methods to satisfy patients, especially in the Middle East as a recent study (Al-Enezi and May, 2015) reported most physiotherapists preferred the use of passive modalities in musculoskeletal settings. Physiotherapists were more likely to base their clinical reasoning decisions on their undergraduate education rather than current evidence-based practice. Therefore approaches to improve physiotherapists' skills and confidence for LBP management, underpinned by current evidence-based practice are essential to improve management of LBP patients in Bahrain and the Gulf region. A combination of hands on and hands-off approaches, such as psychologically informed physiotherapy could be used to transition physiotherapists and patients to accept pain

management approaches. Additionally, training courses have shown positive changes in healthcare practitioners' beliefs and behaviours in Western literature (O'Sullivan et al., 2012), however no changes in patients' outcomes have been found (Overmeer et al., 2009).

7.4.3 The influence of others' beliefs and attitudes towards LBP

Doctors' beliefs and attitudes towards LBP

Findings from the focus groups (Chapter 5) showed that participants were reliant on advice from doctors and other healthcare professionals. Participants reported incidents where doctors have advised them to rest or reduce their activity, instances where diagnoses they have been offered increased their fear of movement, and other instances where discussions with doctors about surgical procedures have left them with negative views. These findings suggest that improving physiotherapists' confidence to deal with LBP is not sufficient as patients are likely to be referred from doctors with biomedical views of LBP and physiotherapy management. Therefore, the effort to modify patients' beliefs and facilitate behaviour change should not be a single-clinician effort. MacPherson et al., (2013) reports that physiotherapists in Kuwait identified the lack of multidisciplinary practice and communication, that they have been involved in and come to value during their professional development in Western countries, as a threat to their profession locally. It is suggested that physiotherapists call for early involvement in patients' care, such as multidisciplinary pain clinics, or hold in-service training to change other clinicians' opinion of pain management and physiotherapy's role in the management of LBP.

There is a lack of literature reporting on attempts to change doctors' beliefs and attitudes towards chronic pain in Arab healthcare systems, therefore findings from the Western studies were examined. Jellema et al., (2005) found that general practitioners (GP) attitudes were influenced following a short training session about LBP and psychosocial factors. The change in GP's attitude did not result in a change in GP's behaviour and or patient-related outcomes (FABs, coping strategies or distress) compared to participants randomised to usual care. However, participants in the intervention group reported greater satisfaction following their GP consultation. Attempts to encourage doctors' towards more of a biopsychosocial approach can be challenging due to doctors' own professional and/or financial interests, health policy decisions, access and payment of healthcare costs, legislation regarding absence and compensation and political agendas (Main et al., 2010). Some obstacles to culturally-sensitive care in the Gulf Region have been proposed (Lovering, 2006). Doctors and other healthcare professionals in the Gulf Region come from diverse multi-cultural backgrounds (e.g. Asians,

Europeans). Therefore, it is expected that they come with their own culturally-influenced beliefs and attitudes towards LBP. Secondly, there has been limited understanding of patients' needs to inform culturally-sensitive care. Although private healthcare services are widely available in Bahrain and two patients' reported their preference for private services (Chapter 5), differences in public and private healthcare provision, doctors' own professional and financial interests have not been investigated as barriers to changing LBP beliefs and attitudes.

Other patients and members of society

Findings from the focus groups (Chapter 5) also showed that patients valued advice and interactions with other LBP patients. Physiotherapists have identified that the lack of the public's understanding of physiotherapist role as a threat to their profession (MacPherson et al., 2013). Therefore negative beliefs and behaviours of other LBP suffers, or society as a whole, could influence those currently seeking treatment. Supplementary education material to reinforce physiotherapists' instructions could be provided for all LBP patients or a trusted online source in Arabic that patients could be referred to following their first contact with doctor or physiotherapist. The information should not be limited to patients attending a PMP. Additionally, posters in waiting rooms could help manage patients' expectations.

This patient education material should contain culture-specific information. For example; women could be encouraged to communicate their LBP to their family members, and delegate responsibilities at home. Therefore, advice on how to explain your condition with family, or how to involve family members in decision-making could encourage family members to accept and encourage changes women attempt at home. Other examples would be to encourage patients to brainstorm of goals or changes that are of value to them and would like to address with their physiotherapist before attending their first session. An early introduction to the importance of goal setting is important to improve adherence to treatment (Al-Eisa, 2010). Again, culture-specific examples could be provided such as (1) breaking down tasks for large family meals on religious holidays, or (2) alternative ways for women to exercise in the comfort of their own homes or outdoors within culturally accepted constraints. All these steps can help empower patients to take an active part in decision-making.

Findings from Chapter 5 showed that women enjoyed attending the focus groups and the chance to meet other fellow patients. In addition to this, results from the focus group show that patients value other patients' experiences. Therefore, patients could be trained to deliver advice to other women in society. The use of expert patients to help other patients manage long-term conditions has been suggested (Donaldson, 2003; Shaw and Baker, 2004; Tattersall, 2002). Expert patients' experiences (e.g. helpful coping skills) could encourage other patients

to self-manage. Their involvement to help manage chronic conditions is also expected to encourage patients' involvement in decision-making (Donaldson, 2003; Tattersall, 2002). Additionally, expert patients' could help healthcare professionals understand patients' views and needs (Shaw and Baker, 2004).

Some participants reported listening to or watching prayer on TV when they were in pain (Chapter 2). Religious teachings to facilitate behaviour change could be used with patients who appreciate such methods (McCullough and Willoughby, 2009). Key figures in society such as Imams could also be asked for help identifying relevant quotes of the Quran or the prophet's *Hadith*[8] that encourage such concepts (Padela et al., 2011). Beliefs about back pain can be shaped by prevailing community views, therefore interventions that aim to alter community views (targeted towards Bahrain as a whole), may be useful (Main et al., 2010). Modifying the knowledge or attitudes of a large proportion of the community simultaneously provides social support for behavioural change and maintenance of change over time (Buchbinder et al., 2008; Gross et al., 2012; Padela et al., 2011). Although larger and more expensive campaigns have shown more success in influencing beliefs (Buchbinder et al., 2008; Main et al., 2010), a culturally-relevant and acceptable method could be used in Bahrain. Imams traditionally deliver speeches to their sermon prior to Friday prayers. These opportunities could be used to deliver messages about LBP health and the importance of taking responsibility and an active role for one's own health.

7.5 Limitations and suggestions for future research

7.5.1 Updated systematic review

Several validated self-report outcome measures measuring constructs that have been found to associate with LBP disability (Chehida et al., 2015; Din et al., 2015; Kim et al., 2014) have been reported in the literature since December 2012. This warrants an up to date search of cross-sectional studies conducted looking at factors associated with LBP in non-Western countries and to assess for changes on the levels of evidence found by this thesis (Chapter 2) and whether this has implications to research and practice.

[8] *Hadith:* the traditions and saying of the Prophet Mohammed.

7.5.2 Further testing and usage of the self-report outcome measures

Although the Arabic RMDQ, BBQ and CSQ were found to have psychometric properties that are comparable to other versions, further psychometric testing is suggested such as the responsiveness of the measures. Additionally, it is recommended that further investigations into the use of the CSQ are undertaken. Results have shown that participants' responses loaded on four factors that were different to previous studies (see 3.4.2). The utility and stability of the four-factor structure should be explored with LBP patients in Bahrain (Harland and Martin, 2014). Participants also described the use of a religious activity instead of the active strategies suggested by the CSQ (e.g. going to a house of worship instead of going to the cinema or shopping, Chapter 3). Although participants' demonstrated good acceptability (Chapter 3), later findings showed that CSQ subscales had the largest amounts of missing data (Chapter 4). Perhaps the use of traditional and cultural Bahraini activities could improve the acceptability of the CSQ.

Identifying other relevant LBP or chronic pain self-report measures such as the Pain Self-Efficacy Questionnaire (PSEQ) would help clinicians in the assessment and management of LBP patients attending PMPs (Nicholas, 2007). For example, low scores (PSEQ ≤17) could indicate that a patient is in favour of pain relief to increase his/her activity, therefore such patients can be candidates for one to one management prior to enrolment on a PMP (Coughlan et al., 1995; Nicholas, 2007). Assessing for changes in pain self-efficacy beliefs after a PMP could also assess a mechanism which is thought to bring about change. Improvements in self-efficacy are indicators of likeliness to maintain behavioural change or resumption of work given the presence of pain (Nicholas, 2007). Exploring the mechanisms through which interventions are expected to bring about change is crucial to understanding both how the effects of the specific intervention occurred and how these effects might be replicated by similar future interventions (Moore et al., 2015).

A stratified approach using the STarT Back Tool for low back pain management has shown clinical and cost-effectiveness (Hill et al., 2011). Therefore, the usage of the STarT Back Tool in practice, in addition to other measures translated and cross- culturally adapted in this thesis, could encourage physiotherapists in Bahrain to expand management repertoire and consequently more acceptable and confident of their usage of psychologically informed pain management approaches as findings from this thesis and future work transition from findings into practice. Additionally, the involvement of local physiotherapist in further translation and cross-cultural translation procedures could introduce them to the importance of carrying out

and implementing evidence-based practice, and consequently decrease the barriers to allow changes in practice (Aljadi et al., 2013; MacPherson et al., 2013).

7.5.3 Further exploration of experiences and beliefs of subsets of LBP patients

Certain subsets of LBP patients were underrepresented in this thesis. As previously discussed, Bahrain is a Muslim Arab country with Western influence. Levels of Western influence and religiosity could vary between patients. Elderly patients have been found to be more religious in the Middle East (Campbell, 2015). Elderly participants and working participants were underrepresented in this thesis. Young professionals, who have been educated abroad, and work for international businesses might show a larger Western influence. And lastly, it was felt that the male role has not surfaced from the focus groups (Chapter 5) due to the small sample of men interviewed (n=4).

Although religious beliefs and coping statements emerged from qualitative findings (Chapter 5), the active examples given by participants during item-by-item discussions (Chapter 3) have not re-emerged in the focus groups. This could be due to the small sample of elderly participants in the focus groups (n= 2), that are expected to be more religious. On the other hand, one participant (Chapter 3) felt it was strange to fill out the Praying and Hoping subscale of the CSQ. Perhaps, active religious coping strategies such as performing prayer, going to a house of worship or speaking to a member of the clergy for advice might be the "norm" for participants and therefore reporting these activities were not reported by any participants' of the focus groups (Chapter 5). Further investigations of with subsets of patients who value these activities can improve the understanding of their importance to patients, and guide clinicians to help patients set valued rehabilitation goals.

The thesis identified limited findings on relationships between work-related factors and LBP and disability. Further investigations with working professionals could identify such factors, and findings could be incorporated into pain management approaches for LBP in Bahrain. Similarly, further explorations with male patients will allow further understanding and the comparison of the expected social role of males to females in a Muslim Arab society. And in return, this will improve the content of the PMP for male patients.

7.5.4 Investigation of a physiotherapist-led PMP in Bahrain

Results of Chapter 6 showed a trend for positive LBP outcomes following the PMP in the short-term. Participants at 6 months seemed to have higher levels of catastrophizing and fear-

avoidance beliefs compared to 3 months, and anxiety and depression compared to baseline. Additionally, treatment outcomes in the long-term compared to conventional physiotherapy for LBP in Bahrain remain unknown. Therefore, preliminary results of this thesis suggest the following steps should be taken to continue the investigation of the physiotherapist-led PMP in Bahrain.

Pilot randomised controlled trial

Preliminary results encourage a pilot RCT with Bahraini patients, if recommendations suggested for content and structure modification in section 7.2.5 are taken into consideration. Additionally, it is recommended that the inclusion and exclusion criteria is revised. For example, the usage of cut-off points to ensure only patients with a specific level of LBP disability, fear-avoidance beliefs or depression and anxiety; or a stratified approach to care using the STarT Back Tool could improve the researcher's understanding of patients most likely to benefit from the PMP.

A pilot RCT would help test implementation of the PMP in practice and help identify training and support needs. As of date, only one study in the Gulf region (Al-Enezi and May, 2015) has been identified that explores physiotherapists' reasons for decision making in practice, therefore little is known about how physiotherapists will make decisions to refer to the PMP and experiences of participating in the programme. Additionally, the qualitative exploration (Chapter 5) did not formally take physiotherapists opinions and experiences into consideration when designing the intervention. Therefore, it is important to understand how physiotherapists' attitudes and circumstances shape the intervention. It is expected that physiotherapists will face challenges referring to and delivering pain management approaches such as the intervention tested in this thesis similarly to reports from Western physiotherapists as discussed in sections 7.3 (similar education to Western physiotherapists) and 7.4.2 (challenges with involving patients in LBP management).

Randomised controlled trial

If the pilot was successful, a larger RCT is required to evaluate treatment efficacy and cost-effectiveness in larger numbers. It is recommended that the RCT is accompanied with a complete process evaluating implementation and mechanisms of impact, such as changes in self-efficacy (section 7.5.2) in accordance with recent guidelines (Moore et al., 2013; Moore et al., 2015).

7.6 Conclusions

The aim of this thesis was to design and then determine the feasibility and acceptability of a physiotherapist-led pain management programme for LBP patients in Bahrain. Five studies were conducted to achieve this aim.

In conclusion, this study has found:

- Results of a systematic review show similar results to reviews of mainly Western studies. Evidence was strong for fear-avoidance beliefs having a low association with LBP disability, but inconclusive for predicting changes in LBP disability in non-Western countries. Evidence was moderate for a moderate association for LBP disability with pain intensity and no association with symptom duration, and evidence was weak for moderate association with chance locus of control.
- The Arabic RMDQ, BBQ and CSQ questionnaires have acceptable agreement with the English versions. All three outcome measures had high test-retest reliability and high internal consistency with the exception of the CSQ Praying and Hoping subscale. They had acceptable construct validity that was comparable with other language versions.
- Results of a cross-sectionals survey shows that 34.7% of the variance in LBP in Bahrain is attributed to age, gender, pain intensity, back pain-related beliefs, fear-avoidance beliefs about physical activity and work, ability to ignore pain, control pain and decrease pain, depression and anxiety.
- Participant beliefs, experiences within the healthcare system and needs are similar to patients' experiences in other Western countries. Differences were apparent between genders; Bahraini females' reported on the importance of maintaining identity and independence. Religious and cultural beliefs were found to influence pain-related beliefs, fear-avoidance beliefs and catastrophizing,
- LBP outcomes immediately post the intervention and at 3 months. However, FABs about physical activity, catastrophising, depression and anxiety scores were higher at 6 months, indicating that such participants could have been more likely to attend follow-up at 6 months. Although participants found the PMP credible and acceptable, the PMP had a large attrition rate. Modifications to the inclusion and exclusion criteria, and to the content / structure of the programme have been suggested to improve the acceptability of the intervention and reduce attrition rates; such as spacing the 9 sessions over 4 to 6 weeks, the use of a booster phone call between patients, and provision of patients with electronic means to provide the research team with data to allow for more time to discuss concerns and barriers to achieving their goals.

- It is recommended that the suggestions are considered to improve the PMP and further exploration is undertaken with physiotherapists expected to work alongside the programme. Following that, the PMP warrants further investigation further with larger numbers, longer follow-up periods and against usual physiotherapy care in Bahrain.

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Appendix 1: Data Extraction Table

Authors:

Title:

General			
Country			
Aim			
Design			
Outcome measures			
	Tool	Language	References or study tests validation
Disability			
Prognostic Factors			
	Tool	Language	References or study tests validation
Sample			
Definition of LBP			
Inclusion			
Exclusion			
n =			
M:F			
Age			
Statistical plan			
Statistical test		Testing	
Main results			
Results			
Outcome measure	Mean	SD	
Correlations			
Disability outcome measure:			
Factors	Correlation strength	Significance	
Regression			
Limitations and Bias			
Implications			
to clinical settings			
to Bahraini population			

Appendix 2: Criteria for Methodological Quality Assessment

Criteria List for Methodological Quality Assessment	**Authors:_____ Study Design: _____**	**___ / 15 or 20 points**
1. The research question is well stated Patient selection: 2. The population is well identified 3. The inclusion and exclusion criteria are defined and appropriate 4. For RCT treatment allocation a) Was a method of randomization performed? b) Was the treatment allocation concealed? 5. Participation rate is reported and appropriate 6. Are all subjects representing of the same underlying population? 7. Are the various groups comparable at baseline?		
Prognostic factors 8. The methods used to measure the baseline prognostic variables are valid and reliable 9. The prognostic factor(s) is (are) measured in a standardized way 10. Other relevant prognostic factors are measured		
Interventions 11. Additional treatment effects during period of observation are avoided or comparable 12. The intervention(s) is (are) explicitly described 13. The compliance is acceptable in all groups		
Outcome measurement 14. The same data collection is used for all members of the cohort 15. The methods used to measure the outcome are defined and measureable 16. The methods used to measure the outcome are valid and reliable 17. Percentage of follow-up is reported, explained and reasonable 18. loss to follow-up is equal in different groups 19. The duration of follow-up is adequate a) Was a short-term follow-up measurement performed? b) Was a long-term follow-up measurement performed?		
Statistics 20. The sample size provides adequate statistical power 21. Was the statistical methodology appropriate for the research question and study design? 22. An intention-to-treat analysis is performed 23. Control for statistical significance		

24. Control for multicollinearity 25. The results are verifiable from the data		
General 26. Was bias or random error likely to have been avoided?		
Internal Validity Criteria ***Comment on*** The source population was well identified (2) Inclusion and exclusion criteria were defined and appropriate (3) The methods used to measure the prognostic factors were valid and reliable (8) The outcome was well defined and measureable (15) The measures of outcome were valid and reliable (16) The participation rate and percentage follow-up was reported and appropriate (together at least 60%) or a comparative analysis of participants and nonparticipants was presented (5, 7) Was bias or random error likely to have been avoided (26)		

Appendix 3: The Roland-Morris Disability Questionnaire

When your back hurts, you may find it difficult to do some of the things you normally do. This list contains sentences that people have used to describe themselves when they have back pain. When you read them, you may find that some stand out because they describe you *today*. As you read the list, think of yourself *today*. When you read a sentence that describes you today, put a tick against it. If the sentence does not describe you, then leave the space blank and go on to the next one. Remember, only tick the sentence if you are sure it describes you today.

1. I stay at home most of the time because of my back.
2. I change position frequently to try and get my back comfortable.
3. I walk more slowly than usual because of my back.
4. Because of my back I am not doing any of the jobs that I usually do around the house.
5. Because of my back, I use a handrail to get upstairs.
6. Because of my back, I lie down to rest more often.
7. Because of my back, I have to hold on to something to get out of an easy chair.
8. Because of my back, I try to get other people to do things for me.
9. I get dressed more slowly then usual because of my back.
10. I only stand for short periods of time because of my back.
11. Because of my back, I try not to bend or kneel down.
12. I find it difficult to get out of a chair because of my back.
13. My back is painful almost all the time.
14. I find it difficult to turn over in bed because of my back.
15. My appetite is not very good because of my back pain.
16. I have trouble putting on my socks (or stockings) because of the pain in my back.
17. I only walk short distances because of my back.
18. I sleep less well because of my back.
19. Because of my back pain, I get dressed with help from someone else.
20. I sit down for most of the day because of my back.
21. I avoid heavy jobs around the house because of my back.
22. Because of my back pain, I am more irritable and bad tempered with people than usual.
23. Because of my back, I go upstairs more slowly than usual.
24. I stay in bed most of the time because of my back.

Note to users:

This questionnaire is taken from: Roland MO, Morris RW. A study of the natural history of back pain. Part 1: Development of a reliable and sensitive measure of disability in low back pain. Spine 1983; 8: 141-144

The score of the RDQ is the total number of items checked – i.e. from a minimum of 0 to a maximum of 24. It is acceptable to add boxes to indicate where patients should tick each item. The questionnaire may be adapted for use on-line or by telephone.

Appendix 4: Back Beliefs Questionnaire

We are trying to find out what people think about low-back trouble. Please indicate your general views toward back trouble, even if you have never had any.

Please answer ALL statements and indicate whether you agree or disagree with each statement by circling the appropriate number on the scale. 1 = COMPLETELY DISAGREE, 5 = COMPLETELY AGREE.

1	2	3	4	5
COMPLETELY DISAGREE				COMPLETELY AGREE

		Disagree				Agree
1	There is no real treatment for back trouble.	1	2	3	4	5
2	Back trouble will eventually stop you from working.	1	2	3	4	5
3	Back trouble means periods of pain for the rest of one's life.	1	2	3	4	5
4	Doctors cannot do anything for back trouble.	1	2	3	4	5
5	A bad back should be exercised.	1	2	3	4	5
6	Back trouble makes everything in life worse.	1	2	3	4	5
7	Surgery is the most effective way to treat back trouble.	1	2	3	4	5
8	Back trouble may mean you end up in a wheelchair.	1	2	3	4	5
9	Alternative treatments are the answer to back trouble.	1	2	3	4	5
10	Back trouble means long periods of time off work.	1	2	3	4	5
11	Medication is the only way of relieving back trouble.	1	2	3	4	5
12	Once you have had back trouble there is always a weakness.	1	2	3	4	5
13	Back trouble must be rested.	1	2	3	4	5
14	Later in life back trouble gets progressively worse.	1	2	3	4	5

The inevitability measure comprises 1 scale using a subset of 9 items.
Items 1, 2, 3, 6, 8, 10, 12, 13, 14.

From: Symonds, T. L., Burton, A. K., Tilloston, K. M., & Main, C. J. (1996) Do attitudes and beliefs influence work loss due to low back trouble? *Occupational Medicine, 46, 25 – 31.*

Appendix 5: Pain Coping Strategies Questionnaire

PAIN COPING STRATEGIES QUESTIONNAIRE

Name:.....

Date:..... **Record Number:**.....

Individuals who experience pain have developed a number of ways to cope or deal with their pain. These include saying things to themselves when they experience pain, or engaging in different activities. Below are a list of things that people have reported doing when they feel pain. For each activity, I would like you to indicate, using the scale below, how much you engage in that activity when you feel pain. An 0 indicates that you never do that activity when you are experiencing pain, a 3 indicates you sometimes do it when you are experiencing pain, and a 6 indicates you always do it when you are experiencing pain. Remember, you can use any point along the scale. Write the appropriate number in the box beside each question.

0	1	2	3	4	5	6
Never do			*Sometimes do that*			*Always do that*

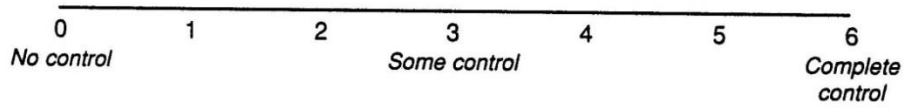
When I feel pain . . .

☐ 1. I try to feel distant from the pain, almost as if the pain was in somebody else's body.
☐ 2. I leave the house and do something, such as going to the cinema or shopping.
☐ 3. I try to think of something pleasant.
☐ 4. I don't think of it as pain but rather as a dull or warm feeling.
☐ 5. It is terrible and I feel it is never going to get any better.
☐ 6. I tell myself to be brave and carry on despite the pain.
☐ 7. I read.
☐ 8. I tell myself that I can overcome the pain.
☐ 9. I count numbers in my head or run a song through my mind.
☐ 10. I just think of it as some other sensation, such as numbness.
☐ 11. It is awful and I feel that it overwhelms me.
☐ 12. I play mental games with myself to keep my mind off the pain.
☐ 13. I feel my life isn't worth living.
☐ 14. I know someday someone will be here to help me and it will go away for a while.
☐ 15. I pray to God it won't last long.
☐ 16. I try not to think of it as my body, but rather as something separate from me
☐ 17. I don't think about the pain.
☐ 18. I try to think years ahead, what everything will be like after I've got rid of the pain.
☐ 19. I tell myself it doesn't hurt.
☐ 20. I tell myself I can't let the pain stand in the way of what I have to do.
☐ 21. I don't pay any attention to it.
☐ 22. I have faith in doctors that someday there will be a cure for my pain.

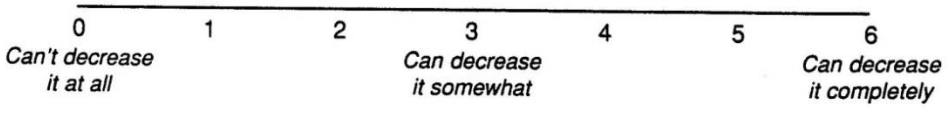
When I feel pain . . .

- ☐ 23. No matter how bad it gets, I know I can handle it.
- ☐ 24. I pretend it is not there
- ☐ 25. I worry all the time about whether it will end.
- ☐ 26. I replay in my mind pleasant experiences in the past.
- ☐ 27. I think of people I enjoy doing things with.
- ☐ 28. I pray for the pain to stop.
- ☐ 29. I imaging that the pain is outside of my body.
- ☐ 30. I just go on as if nothing happened.
- ☐ 31. I see it as a challenge and don't let it bother me.
- ☐ 32. Although it hurts, I just keep on going.
- ☐ 33. I feel I can't stand it any more.
- ☐ 34. I try to be around other people.
- ☐ 35. I ignore it.
- ☐ 36. I rely on my faith in God.
- ☐ 37. I feel like I can't go on.
- ☐ 38. I think of things I enjoy doing.
- ☐ 39. I do anything to get my mind off the pain.
- ☐ 40. I do something I enjoy, such as watching television or listening to music.
- ☐ 41. I pretend it is not part of me.
- ☐ 42. I do something active, like household chores or projects.

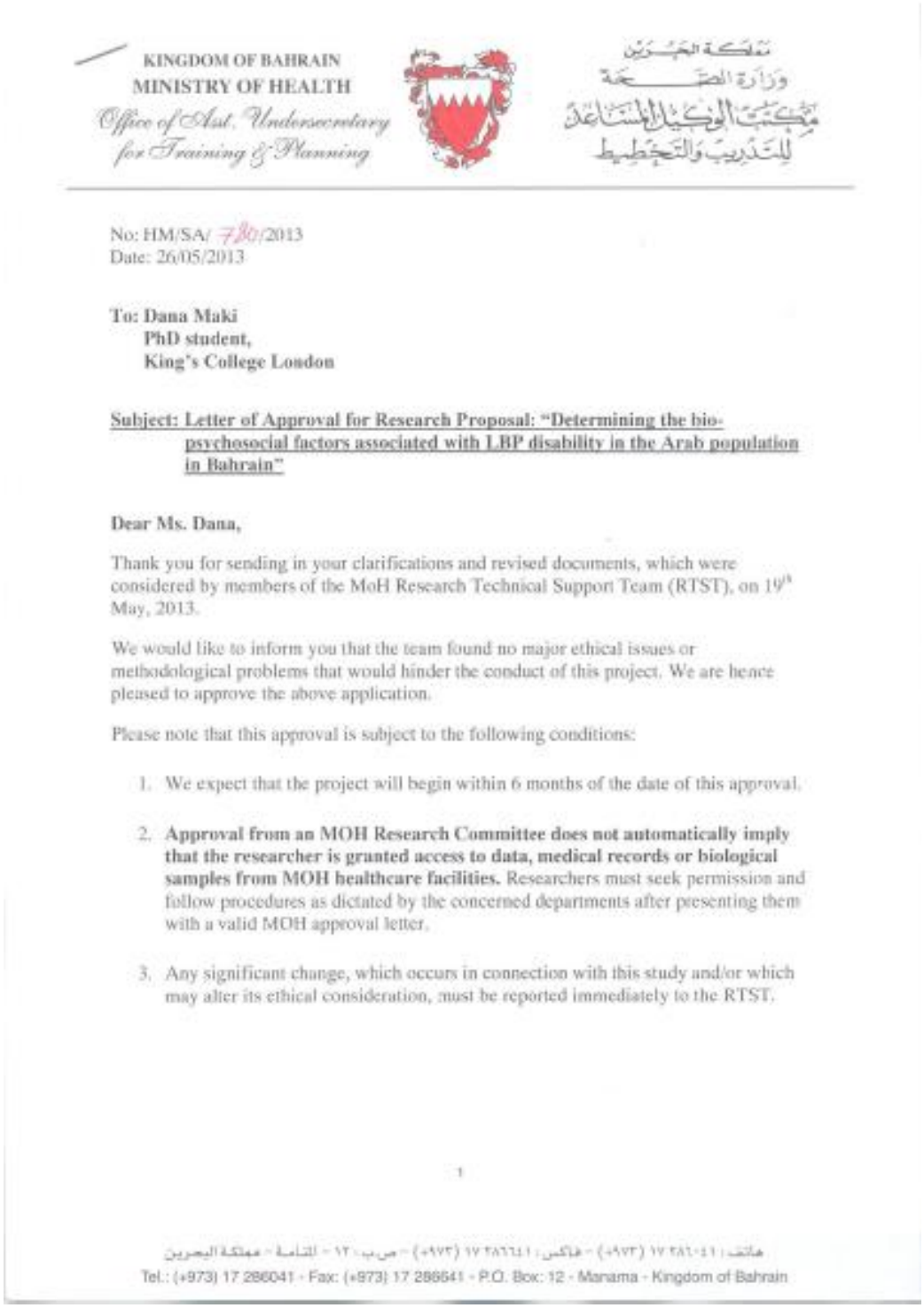
Based on all the things you do to cope or deal with your pain, on an average day, how much control do you feel you have over it? Please circle the appropriate number. Remember, you can circle any number along the scale.



Based on all the things you do to cope or deal with your pain, on an average day, how much are you able to decrease it? Please circle the appropriate number. Remember, you can circle any number along the scale.



Appendix 6: Ethical Approval from Ministry of Health, Bahrain (HM/SA/780/2013)



KINGDOM OF BAHRAIN
MINISTRY OF HEALTH
Office of Asst. Undersecretary for Training & Planning

مملكة البحرين
وزارة الصحة
مكتب الوكيل المساعد للتدريب والتخطيط

No: HM/SA/ 780/2013
Date: 26/05/2013

To: Dana Maki
PhD student,
King's College London

Subject: Letter of Approval for Research Proposal: "Determining the bio-psychosocial factors associated with LBP disability in the Arab population in Bahrain"

Dear Ms. Dana,

Thank you for sending in your clarifications and revised documents, which were considered by members of the MoH Research Technical Support Team (RTST), on 19th May, 2013.

We would like to inform you that the team found no major ethical issues or methodological problems that would hinder the conduct of this project. We are hence pleased to approve the above application.

Please note that this approval is subject to the following conditions:

1. We expect that the project will begin within 6 months of the date of this approval.
2. **Approval from an MOH Research Committee does not automatically imply that the researcher is granted access to data, medical records or biological samples from MOH healthcare facilities.** Researchers must seek permission and follow procedures as dictated by the concerned departments after presenting them with a valid MOH approval letter.
3. Any significant change, which occurs in connection with this study and/or which may alter its ethical consideration, must be reported immediately to the RTST.

1

هاتف: ٢٨٦٠٤١ ١٧ (٩٧٣+) - فاكس: ٢٨٦٦٤١ ١٧ (٩٧٣+) - ص.ب: ١٢ - المنامة - مملكة البحرين
Tel.: (+973) 17 286041 - Fax: (+973) 17 286641 - P.O. Box: 12 - Manama - Kingdom of Bahrain

4. This approval is valid for up to **1 year** from the date of approval. If the study extends beyond this date, a progress report must be sent to the RTST to renew the approval.

5. The RTST must be informed when the research has been completed and a copy of the final research report must be submitted for our records.

We wish you all the best in this study.

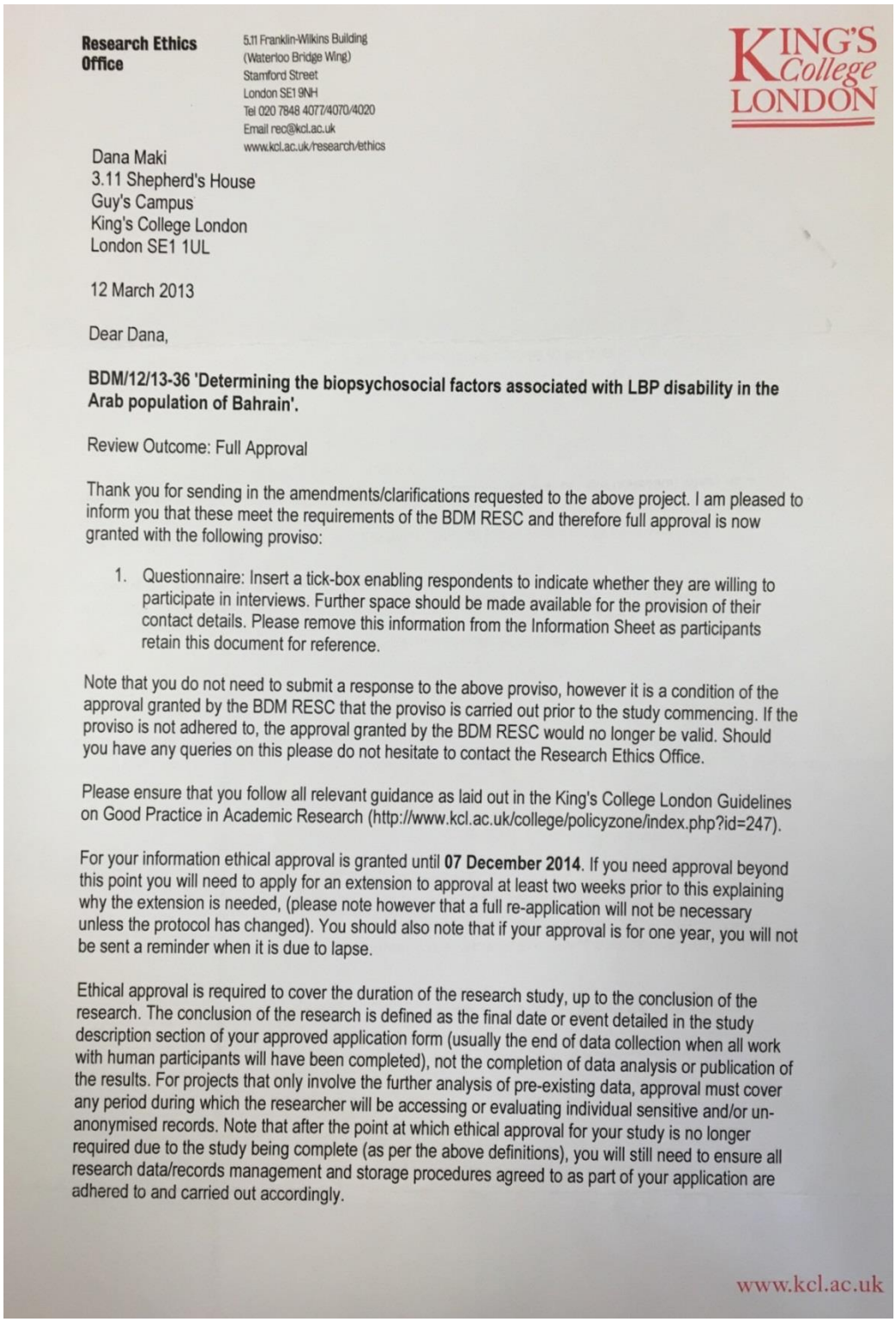
Yours sincerely,

Dr. Hala Ebrahim Al-Mehza
Assistant Undersecretary for Training and Planning
Chairperson, Research Technical Support Team

CC:
- Team file

هاتف: ١٧ ٢٨٦٠٤١ (٩٧٣+) - فاكس: ١٧ ٢٨٦٦٤١ (٩٧٣+) - ص.ب: ١٢ - المنامة - مملكة البحرين
Tel.: (+973) 17 286041 - Fax: (+973) 17 286641 - P.O. Box: 12 - Manama - Kingdom of Bahrain

Appendix 7: Ethical Approval from King's College London (BDM/12/13-36)



Research Ethics Office

5.11 Franklin-Wilkins Building
(Waterloo Bridge Wing)
Stamford Street
London SE1 9NH
Tel 020 7848 4077/4070/4020
Email rec@kcl.ac.uk
www.kcl.ac.uk/research/ethics

KING'S College LONDON

Dana Maki
3.11 Shepherd's House
Guy's Campus
King's College London
London SE1 1UL

12 March 2013

Dear Dana,

BDM/12/13-36 'Determining the biopsychosocial factors associated with LBP disability in the Arab population of Bahrain'.

Review Outcome: Full Approval

Thank you for sending in the amendments/clarifications requested to the above project. I am pleased to inform you that these meet the requirements of the BDM RESC and therefore full approval is now granted with the following proviso:

1. Questionnaire: Insert a tick-box enabling respondents to indicate whether they are willing to participate in interviews. Further space should be made available for the provision of their contact details. Please remove this information from the Information Sheet as participants retain this document for reference.

Note that you do not need to submit a response to the above proviso, however it is a condition of the approval granted by the BDM RESC that the proviso is carried out prior to the study commencing. If the proviso is not adhered to, the approval granted by the BDM RESC would no longer be valid. Should you have any queries on this please do not hesitate to contact the Research Ethics Office.

Please ensure that you follow all relevant guidance as laid out in the King's College London Guidelines on Good Practice in Academic Research (http://www.kcl.ac.uk/college/policyzone/index.php?id=247).

For your information ethical approval is granted until **07 December 2014**. If you need approval beyond this point you will need to apply for an extension to approval at least two weeks prior to this explaining why the extension is needed, (please note however that a full re-application will not be necessary unless the protocol has changed). You should also note that if your approval is for one year, you will not be sent a reminder when it is due to lapse.

Ethical approval is required to cover the duration of the research study, up to the conclusion of the research. The conclusion of the research is defined as the final date or event detailed in the study description section of your approved application form (usually the end of data collection when all work with human participants will have been completed), not the completion of data analysis or publication of the results. For projects that only involve the further analysis of pre-existing data, approval must cover any period during which the researcher will be accessing or evaluating individual sensitive and/or un-anonymised records. Note that after the point at which ethical approval for your study is no longer required due to the study being complete (as per the above definitions), you will still need to ensure all research data/records management and storage procedures agreed to as part of your application are adhered to and carried out accordingly.

www.kcl.ac.uk

If you do not start the project within three months of this letter please contact the Research Ethics Office.

Should you wish to make a modification to the project or request an extension to approval you will need approval for this and should follow the guidance relating to modifying approved applications: http://www.kcl.ac.uk/innovation/research/support/ethics/applications/modifications.aspx
The circumstances where modification requests are required include the addition/removal of participant groups, additions/removal/changes to research methods, asking for additional data from participants, extensions to the ethical approval period. Any proposed modifications should only be carried out once full approval for the modification request has been granted.

Any unforeseen ethical problems arising during the course of the project should be reported to the approving committee/panel. In the event of an untoward event or an adverse reaction a full report must be made to the Chair of the approving committee/review panel within one week of the incident.

Please would you also note that we may, for the purposes of audit, contact you from time to time to ascertain the status of your research.

If you have any query about any aspect of this ethical approval, please contact your panel/committee administrator in the first instance (http://www.kcl.ac.uk/innovation/research/support/ethics/contact.aspx). We wish you every success with this work.

With best wishes

Yours sincerely,

Rosie Pearson
Research Support Officer

Cc. Dr. Duncan Critchley

Appendix 8: Fear-avoidance beliefs questionnaire

Purpose: The FABQ was developed by Waddell to investigatefear-avoidance beliefs among LBP patients in the clinical setting.[3] This survey can help predict those that have a high pain avoidance behavior. Clinically, these peoplemay need to be supervised more than those that confront their pain.

Scoring: The FABQ consists of 2 subscales, which are reflected in the division of the outcome form into 2 separate sections. The first subscale (items 1-5) is the Physical Activity subscale (FABQPA), and the second subscale (items 6-16) is the Work subscale (FABQW). Interestingly, not all items contribute to the score for each subscale; however the patient should still complete all items asthese items were included when the reliability and validity of the scale wasinitially established. A low FABQW score (less than 19) was one of 5 variables in a clinical prediction rule that increased the probability of success from SI region manipulation in individuals with low back pain.[1] Each subscale is graded separately by summing the responses respective scale items (0 – 6 foreach item); for scoring purposes, only 4 of the physical activity scale items arescored (24 possible points) and only 7 of the work items (42 possible points). The method to score each subscale is outlined below. (Note: It is extremelyimportant to ensure all items are completed, as there is no procedure to adjust for incomplete items.)

Scoring the Physical Activity subscale (FABQPA)
Sum items 2, 3, 4, and 5 (the score circled by the patient for these items).

Scoring the Work subscale (FABQW)
Sum items 6, 7, 9, 10, 11, 12, and 15.

Measurement Characteristics: The FABQ has been demonstrated to bevalid and reliable in a chronic LBP population[3] and appears to be a useful screening tool for identifying acute LBP patients who will not return to work by4wks.[2]

References:

1. Flynn T, Fritz J, Whitman J, Wainner R, et al. Clinical Prediction Rule for Classifying Patients with Low Back Pain Likely to Respond to a Manipulation Technique. Spine (In Press) 2002.
2. Fritz JM, George SZ, Delitto A. The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status. Pain 2001; 94:7-15.
3. Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. Pain 1993; 52:157-168

Here are some of the things which other patients have told us about their pain. For each statement please circle any number from 0 to 6 to say how much physical activities such as bending, lifting, walking or driving affect or would affect your back pain.

	COMPLETELY DISAGREE			UNSURE			COMPLETELY AGREE
1. My pain was caused by physical activity	0	1	2	3	4	5	6
2. Physical activity makes my pain worse	0	1	2	3	4	5	6
3. Physical activity might harm my back	0	1	2	3	4	5	6
4. I should not do physical activities which (might) make my pain worse	0	1	2	3	4	5	6
5. I cannot do physical activities which (might) make my pain worse	0	1	2	3	4	5	6

The following statements are about how your normal work affects or would affect your back pain.

	COMPLETELY DISAGREE			UNSURE			COMPLETELY AGREE
6. My pain was caused by my work or by an accident at work	0	1	2	3	4	5	6
7. My work aggravated my pain	0	1	2	3	4	5	6
8. I have a claim for compensation for my pain	0	1	2	3	4	5	6
9. My work is too heavy for me	0	1	2	3	4	5	6
10. My work makes or would make my pain worse	0	1	2	3	4	5	6
11. My work might harm my back	0	1	2	3	4	5	6
12. I should not do my normal work with my present pain	0	1	2	3	4	5	6
13. I cannot do my normal work with my present pain	0	1	2	3	4	5	6
14. I cannot do my normal work until my pain is treated	0	1	2	3	4	5	6
15. I do not think that I will be back to my normal work within 3 months	0	1	2	3	4	5	6
16. I do not think that I will ever be able to go back to that work	0	1	2	3	4	5	6

استمارة لمعرفة مدى تأثير خوف المصابين بأوجاع الظهر السفلي من الحركة وامتناعهم عنها

الاستمارة تشمل بعض الجمل التي أخبرنا بها المرضى بخصوص آلامهم. لكل ادعاء الرجاء اختيار رقم من 0 إلى 6 لتعبّر به عن مدى تأثير أو إمكانية تأثير النشاط ألجسماني مثل: الانحناء، حمل الأشياء، المشي، أو السواقة على أوجاع الظهر السفلي. **اختر إجابة واحدة وضع دائرة حول الرقم المناسب.**

	غير موافق بالمرّة			**غير متأكد**			**موافق تماماً**
1. النشاط الجسماني يسّبب لي الألم.	0	1	2	3	4	5	6
2. النشاط الجسماني يجعل ألمي أشّد.	0	1	2	3	4	5	6
3. النشاط الجسماني يمكن أن يؤذي ظهري.	0	1	2	3	4	5	6
4. مفضّل أن لا أقوم بنشاط جسماني الذي يمكن أن يجعل وجع ظهري أشّد.	0	1	2	3	4	5	6
5. لا أقدر القيام بنشاطات جسمانيّة التي يمكن أن تجعل وجع ظهري أشّد.	0	1	2	3	4	5	6

تتعلّق الإدعاءات التاليّة بشأن عملك وتأثيره أو إمكانية تأثيره على أوجاع الظهر السفلي. **اختر إجابة واحدة وضع دائرة حول الرقم المناسب.**

	غير موافق بالمرّة			**غير متأكد**			**موافق تماماً**
6. وجعي كان بسبب عملي أو نتيجة لإصابة عمل.	0	1	2	3	4	5	6
7. وجعي يتفاقم بسبب عملي.	0	1	2	3	4	5	6
8. لديّ ادعاء للحصول على تعويض بسبب الوجع.	0	1	2	3	4	5	6
9. عملي صعب جداً بالنسبة لي.	0	1	2	3	4	5	6
10. عملي يجعل أو قد يساهم في جعل وجعي أشدّ.	0	1	2	3	4	5	6
11. عملي قد يسبّب أذىً لظهري.	0	1	2	3	4	5	6
12. مفضّل أن لا أمارس عملي الطبيعي مع وجعي الحالي.	0	1	2	3	4	5	6
13. لا أقدر على ممارسة عملي الطبيعي مع وجعي الحالي.	0	1	2	3	4	5	6
14. لا أقدر أن أمارس عملي الطبيعي حتى يتّم علاجي.	0	1	2	3	4	5	6
15. لا أعتقد أنني استطيع العودة إلى عملي الطبيعي خلال الثلاثة أشهر القادمة.	0	1	2	3	4	5	6
16. أعتقد أنني لن أستطيع العودة إلى عملي أبداً.	0	1	2	3	4	5	6

Appendix 9: Hospital Anxiety and Depression Scale

Hospital Anxiety and Depression Scale (HADS)

GL assessment
the measure of potential

Name: _____ Date: _____

Clinicians are aware that emotions play an important part in most illnesses. If your clinician knows about these feelings he or she will be able to help you more.

This questionnaire is designed to help your clinician to know how you feel. Read each item below and **underline the reply** which comes closest to how you have been feeling in the past week. Ignore the numbers printed at the edge of the questionnaire.

Don't take too long over your replies, your immediate reaction to each item will probably be more accurate than a long, thought-out response.

A	D		A	D
		I feel tense or 'wound up'		
3		Most of the time		3
2		A lot of the time		2
1		From time to time, occasionally		1
0		Not at all		0
		I still enjoy the things I used to enjoy		
	0	Definitely as much		
	1	Not quite so much		
	2	Only a little		
	3	Hardly at all		
		I get a sort of frightened feeling as if something awful is about to happen		
3		Very definitely and quite badly		3
2		Yes, but not too badly		2
1		A little, but it doesn't worry me		1
0		Not at all		0
		I can laugh and see the funny side of things		
	0	As much as I always could		
	1	Not quite so much now		
	2	Definitely not so much now		
	3	Not at all		
		Worrying thoughts go through my mind		
3		A great deal of the time		
2		A lot of the time		
1		Not too often		
0		Very little		
		I feel cheerful		
	3	Never		
	2	Not often		
	1	Sometimes		
	0	Most of the time		
		I can sit at ease and feel relaxed		
0		Definitely		
1		Usually		
2		Not often		
3		Not at all		
		I feel as if I am slowed down		
		Nearly all the time		3
		Very often		2
		Sometimes		1
		Not at all		0
		I get a sort of frightened feeling like 'butterflies' in the stomach		
		Not at all	0	
		Occasionally	1	
		Quite often	2	
		Very often	3	
		I have lost interest in my appearance		
		Definitely		3
		I don't take as much care as I should		2
		I may not take quite as much care		1
		I take just as much care as ever		0
		I feel restless as if I have to be on the move		
		Very much indeed	3	
		Quite a lot	2	
		Not very much	1	
		Not at all	0	
		I look forward with enjoyment to things		
		As much as I ever did		0
		Rather less than I used to		1
		Definitely less than I used to		2
		Hardly at all		3
		I get sudden feelings of panic		
		Very often indeed	3	
		Quite often	2	
		Not very often	1	
		Not at all	0	
		I can enjoy a good book or radio or television programme		
		Often		0
		Sometimes		1
		Not often		2
		Very seldom		3

Now check that you have answered all the questions

A	D
TOTAL	

مقياس عواطف المريض

يدرك الأطباء أن العواطف تلعب دوراً مهماً في معظم الأمراض. معرفة الأطباء عن هذه المشاعر قد تساعد على توفير العنايه المناسبه لك. اقرأ الجمل التاليه وضع علامة √ بجانب البند الذي يصف شعورك خلال الأسبوع الماضي. تجاهل الأرقام المطبوعه على حافة الاستبيان. لا تأخذ وقتاً طويلاً وأنت تدرس الجمل، بل ضع علامة √ حين ما تشعر أن الجمله تصف حالتك.

1	**أشعر بحالة توتر وضيق**	A	
	معظم الوقت	3	
	كثيراً من الوقت	2	
	أحياناً	1	
	لا يحدث ذلك اطلاقاً	0	
2	**ما زلت أستمتع بالأشياء التي كنت أستمتع بها من قبل**		D
	بنفس الدرجه السابقه تماماً		0
	بدرجة أقل قليلاً عن ذي قبل		1
	بدرجة أقل كثيرأص عن ذي قبل		2
	لا أستطيع أن أستمتع بأي شيء		3
3	**ينتابني احساس بالخوف وكأن شيئاً سيئاً على وشك أن يحدث**	A	
	أكيد وبصورة سيئه جداً	3	
	نعم ولكن ليس بصوره سيئه جداً	2	
	قليلاً ولكنه لا يزعجني	1	
	لا اطلاقاً	0	
4	**أستطيع أن أضحك وأن أرى الفكاهة في المواقف**		D
	تماماً كما كنت من قبل		0
	بدرجة أقل من ذي قبل		1
	بالتأكيد ليس مثلما كنت من قبل		2
	لا اطلاقاً		3
5	**تنتابني نوبات من التفكير القلق المزعج**	A	
	معظم الوقت	3	
	كثيراً من الوقت	2	
	أحياناً	1	
	قليلاً جداً	0	
6	**أحس بالفرح والانشراح**		D
	لا بالمره		3
	قليلاً		2
	أحياناً		1
	في معظم الوقت		0
7	**أستطيع أن أجلس بهدوء وارتياح وأحس بالاسترخاء**	A	
	بالتأكيد	0	
	عادة	1	
	ليس كثيراً	2	
	اطلاقاً	3	
8	**أشعر وكأني أصبحت خاملاً وبطيءاً في حركتي**		D
	في كل الأوقات تقريباً		3
	في كثير من الأحيان		2
	في بعض الأحيان		1
	لا اطلاقاً		0

9	**ينتابني احساس في المعده كالشعور بالخوف أو وجود فراشات بداخلها**	A	
	لا اطلاقاً	0	
	أحياناً	1	
	كثيراً	2	
	كثيراً جداً	3	
10	**فقدت اهتمامي بمظهري**		D
	بالتأكيد		3
	أهتم بمظهري أقل مما ينبغي		2
	لا أهتم بمظهري كما كنت سابقاً		1
	ما زلت أهتم بمظهري كما كنت		0
11	**ينتابني شعور بالضجر والملل وعدم المقدره على الاستقرار**	A	
	بدرجة كبيره جداً بالتأكيد	3	
	بدرجة كبيره	2	
	بدرجه قليله	1	
	لا اطلاقاً	0	
12	**أتطلع الى الأستمتاع بالأشياء**		D
	مثلما كنت دائماً		0
	أقل مما كنت سابقاً		1
	بالتأكيد أقل كثيراً		2
	لا أتطلع لذلك على الاطلاق		3
13	**تنتابني نوبات مفاجئه من الخوف والرعب والهلع**	A	
	كثيراً جداً	3	
	كثيراً	2	
	أحياناً	1	
	لا أطلاقاً	0	
14	**أستطيع أن أستمتع بقراءة كتاب جيد أو الاستماع للراديو أو مشاهدة التلفزيون**		D
	دائماً		0
	أحياناً		1
	قليلاً		2
	نادراً		3

Appendix 10: Information sheet for participation in cross-sectional survey

INFORMATION SHEET FOR PARTICIPANTS

King's College Research Ethics No. BDM/12/13-36

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Study title:

"Determining the biopsychosocial factors associated with LBP disability in the Arab population of Bahrain"

A survey to investigate patients' beliefs regarding their low back pain (LBP)

We would like to invite you to participate in this original postgraduate research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important to you to understand why the research is being done and what your participation will involve.

Please take the time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

Who is funding and sponsoring this research?
This work forms part of a PhD study, which is being undertaken at King's College London. The sponsor is King's College London, and the Crown Prince International Scholarship Program of Bahrain is funding the research.

Who has reviewed this study?
The study has been reviewed and approved the by the King's College London Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee ***(BDM/12/13-36).***

What is the purpose of this study?
Low back pain (LBP) is a very common condition. It can lead to a variety of problems including difficulty with daily activities, such as walking, sleeping, mood changes or our relationships with others. We know that in some people back pain gets better, and in others it persists for long periods of time. There are different ways to manage LBP, one of which is through physiotherapy. Physiotherapy methods that help with LBP include the "hands-off" approach, where patients are enabled to deal with their LBP by understanding pain, modifying behaviours, mood and improving coping. These methods can be delivered through Pain Management Programs, in which a physiotherapist teaches a group of patients with back pain how to cope. To this date, little is known about what the Bahrainis knowledge of back pain, what they think of it and how they cope. Therefore, we are undertaking this study to gain an understanding of your beliefs and views towards LBP.

What will happen to me if I choose to participate?
You will fill out questionnaires about your views on LBP, how you cope with LBP, and how LBP affects your mood. You will also complete a questionnaire about some basic socio-demographic questions such as your age, age, gender, education, work, marital status, etc. You may be asked for your feedback on the questionnaire. This will include questions about how long it took you to complete the questionnaire and what was your understanding of the questions. You may be given another copy to fill out within 7 days for us to validate our findings.

We are interested in your opinions and experiences, and there are no wrong or right answers to these questions. The questionnaires are not meant to judge your level of knowledge, your experiences or the type of treatment you are receiving. Apart from time commitment no preparation is necessary. The questionnaire is expected to take 35 to 45 minutes. While filling out the questionnaires, you can choose not to answer questions or to end your participation at any time without giving a reason. You can decide not to give us the questionnaire back if you do not want to. However, once you hand in your questionnaire you cannot be withdrawn from the study as questionnaires are anonymous and do not have participant identifiers, so attempting to locate a certain copy is difficult. If you decide to

take part in this study, you can complete the questionnaire away from the clinic. We can arrange for you to return it to the clinic at a specified time.

What would be involved?
We will explain the format of the questionnaire to you. We will then give you the questionnaires with an envelope. The envelope is for you to seal your questionnaires in when you are done. This ensures your anonymity. When you are done, place the questionnaires in the locked box that will be identified to you by the researcher or physiotherapist in your department. The box is locked and only the researcher will have access to it. Please note that once you place your questionnaire in the box, we cannot withdraw your participation from the study.

By placing the questionnaire in the envelope and submitting it inside the envelope, you are agreeing to participate in this study. Please do not write your name, information or coding that could link the questionnaires to yourself. This way we can ensure that your answers are kept confidential.

No information will be passed back to your hospital about your participation. You will not be named in any part of the research. The transcript will only be read and used by the research team. It may also be used to write and publish academic articles. We will not be able to contact you personally to give you the details of the results, as your participation is completely anonymous. We can send you a report of the final findings. The results of the study may be presented at national or international conferences or published in scientific journals. You will be unidentifiable.

Are there any disadvantages in taking part?
There are no anticipated disadvantages or physical risks to participants.

Will all the information you provide be kept confidential?
The researcher will keep all data confidential. You should be comfortable with the amount of information you decide to give. The questionnaires will be locked and protected in a secure place at King's College London.

If you decide to take part in this study, you will be given the questionnaires to answer. You may wish to take it away to think about it or answer it in your own time. Agreeing to participate does not mean you are obliged to continue your participation and does not mean you have to submit the questionnaire. However, completing the questionnaire and returning it indicates that you are agreeing to participate in this study and that you have given permission for your responses to be used in this study.

You can withdraw at any time without giving a reason. A decision not to participate in the study from the beginning or to withdraw (fail to submit a completed questionnaire) will not affect the care you receive at your hospital.

We are conducting focus groups in conjunction to this study to ask you about your views and beliefs regarding chronic low back pain. If you wish to participate in these focus groups or for more information please tick the box □ and supply us with your contact details:

Name: _____ Contact no. _____

Email: _____ Address: _____

_____

_____

Should you need more detail, please do not hesitate to contact:
Dana Maki Email: dana.maki@kcl.ac.uk Tel: 39469666

What if there is a problem?
If this study has disadvantaged you in any way you can contact King's College London using the details below for further advice and information:

Dr. Duncan Critchley
Academic Department of Physiotherapy / Division of Health and Social Care, School of Medicine, King's College London, Shepherd's House 3.18, Guy's Campus, London SE1 1UL, United Kingdom

Email: duncan.critchley@kcl.ac.uk T: +0044 (0)20 7848 6323 F: +0044 (0)20 7848 6325

لائحة المعلومات للمشاركين في الاستبيان

سيتم منحك نسخة من هذه اللائحة للاحتفاظ بها

استبيان لتحري اعتقادات المرضي عن الم اسفل الظهر

نود ان ندعوك للمشاركة في هذا البحث لرسلة دكتوراه. مشاركتك في هذا البحث اختياريه فيمكنك المشاركه اذا رغبت بذلك. لن يترتب على مشاركتك او عدمها اي تفضيل او تميز. نرجو منك اخذ وقتك في قراءه هذه اللائحة بتعنٍ و قم بمناقشتها مع الاخرين لادراك اهمية مساهمتك قبل اتخاذ قرارك. واذا اردت اية ايضاحات او رغبت في معلومات اضافية فالرجاء الاتصال بالباحث.

تمويل و رعاية هذا الإستبيان:

هذا الإستبيان هو جزء من رسالة دكتوراة في جامعة كنجز كولج لندن King's College London فالراعي هو جامعة كنجز كولج لندن King's College London والممول لهذا الإستبيان برنامج ولي عهد للمنح الدراسيه العالمية.

من قام بمراجعة هذه الدراسة؟

لقد تم مراجعة وموافقة لجنة مبادئ البحوث في جامعة كنجز كولج لندن King's College London.

ماهو الغرض من هذه الدراسة؟

ألم اسفل الظهر ظاهرة منتشرة ويمكن أن تسبب مشاكل عديدة وعوارض جانبيه منها التأثير على الأنشطة اليومية والمشي والنوم وراحة البال والعلاقات مع الآخرين. ومن المعروف في الطب أن هناك من يتحسن وهناك من يعاني من الألم لسنين عدة ولفترات طويلة، وكما نعلم ان هناك طرق مختلة لمكافحة ألم أسفل الظهر ومنها العلاج الطبيعي.

تتضمن اساليب العلاج الطبيعي لمكافحة ألم أسفل الظهر إساليب "لتمكين المريض" وذلك عن طريق تمكين المرضى للتعامل مع الألم عن طريق استيعاب معنى الألم وتغير السلوكيات اليوميه وتحسين قدرتهم على التأقلم. ويمكن الحصول على هذه المعلومات عبر المشاركة في برامج تثقيفيه للتعامل مع الألم. عادة يتم توفير هذه البرامج لمجموعه من المرضى الذين يعانون من ألم أسفل الظهر تحت ارشاد أخصائي علاج طبيعي. ولنجاح هذا البرنامج فإننا بحاجه لمعلومات حول اعتقادات وآراء الشعب البحريني حول ألم أسفل الظهر. ولغاية هذا اليوم هناك القليل من المعلومات عما يعرفه البحرينيون عن ألم أسفل الظهر ومايعتقدونه عنه وكيف يتعايشون معه.

ما هو المتوقع منك اذا وافقت على المشاركه؟

ستقوم بتعبئة إستبيان عن ألم أسفل الظهر وكيفية تعايشك معه وكيف يؤثر هذا الألم على مزاجك وحياتك اليوميه. كما ستقوم بتعبئة إستبيان لجمع معلومات إجتماعية اساسيه كالعمر و نوع الجنس و مستوى التعليم والعمل والحالة الإجتماعية...إلخ. وإذا كنت من المشاركين الأوائل سنقوم بسؤالك (بعد موافقتك) على تعليقاتك بشأن هذا الإستبيان وستكون هذه الأسئلة عن الفترة الزمنية التي إستغرقتها في الإجابة على الإستبيان وبرأيك ما كان غرض ومعنى هذه الأسئلة.

نحن مهتمون بآرائك ووجهة نظرك وتجربتك، فليس هناك أجوبة صحيحة أو مفضله. ليس من هدف الإستبيان اختبار معلوماتك اوالحكم على تجربتك أو العلاج الذي استلمته. ليس هناك الحاجة للتحضير لهذا الإستبيان، فقط نريد جزءاً من. من المتوقع أن يأخذ هذا الإستبيان مدة 30 دقيقة. خلال قرائتك للإستبيان يمكنك الامتناع عن الإجابة أو إنهاء مشاركتك دون الحاجة للتفسير. كما يمكنك الإحتفاظ بالاستبيان دون إرجاعه. ولكن من المهم الانتباه الى التالي: إذا إستلمنا الإستبيان فسيكون من الصعب إعادته إليك بسبب عدم وجود اسماء او ارقام على الاستبيان تدل على هويتك. إذا قررت المشاركة في هذه الدراسة يمكنك الإحتفاظ بالإستبيان للتفكير إذا كنت ستجيب عليه او لا. ويمكننا أن نرتب لك طريقة او وقتاً لاحقاً لإسترجاعه منك.

ماهي الإجراءات المتوقعه؟

سنقوم بشرح لك الإستبيان وبعد ذلك سنسلمك إياه مع ظرف. الرجاء عدم كتابة اسمك او الاشاره بأي دليل يشير إليك لضمان خصوصيتك وسرية أجوبتك. بعد تعبئة الإستبيان، ضعه في الظرف وأغلقه بنفسك، لتضمن الخصوصية. ثم ضع الإستبيان في الصندوق المقفل والذي سيتم تحديده لك من قبل الباحث أو الأخصائي في قسمك. سيكون الصندوق مقفل وسيكون الباحث هو الوحيد الذي سيتمكن

من الحصول على الإستبيان. الرجاء الملاحظة انه لحظة إعادة الإستبيان في الصندوق فإنك لن تتمكن من سحب مشاركتك من هذه الدراسة. الموافقة على الإجابة على الاستبيان وإرجاعه لنا تشير الى موافقتك للمشاركة في الدراسة.

لن نقوم بتزويد عيادتك بمعلومات عن مشاركتك ولن يتم ذكر إسمك في أي جزء من البحث. قراءة وتحليل الاستبيان فقط من قبل فريق البحث في جامعة كنجز كولج لندن King's College London. قد يتم كتابة ونشر هذه التحليلات في البحوث الطبية العالمية او المحلية من دون الإشارة اليك كفرد او مشارك معين. لن نتمكن من الإتصال بك شخصيا لتوفيرك بتفاصيل النتائج وذلك لأن مشاركتك ستكون سريه لضمان خصوصيتك. ولكن يمكننا أن نرسل لك نسخة من النتائج النهائية.

هل هناك أي سلبيات لمشاركتي؟

ليس هناك أي سلبيات متوقعة أو مخاطر من للمشاركه.

هل سيتم الإحتفاظ بجميع المعلومات بشكل سري؟

سيقوم الباحث بالإحتفاظ بجميع المعلومات بشكل خاص وسري. نود منك أن تكون مرتاح من كمية وطبيعة المعلومات التي ستقوم بالمشاركه بها. سيتم تخزين الإستبيانات في منطقة مقفلة في جامعة كنجزكولج لندن.

إذا قررت المشاركة في هذه الدراسة فسيتم إعطائك الإستبيان للإجابة عليه. يمكنك أن تأخذه معك للتفكير في الأسئلة في وقتك الخاص. الموافقة على المشاركة لا تعني أن تواصل المشاركة إلى نهاية الإستبيان ولكن ملئ الإستبيان وإعادته إلينا تشير إلى موافقتك بالمشاركة في هذه الدراسة وإنك أعطيتنا الأذن بإستخدام أجوبتك في هذه الدراسة.

يمكنك الإنسحاب من المشاركة في اي وقت دون إعطاء أي سبب. قرارك بعدم المشاركة (ملئ الإستبيان) أو الإنسحاب (التوقف عن تعبية الإستبيان) لن يؤثر في الرعاية او المعامله التي تحصل عليها في العيادة التي تزورها.

للحصول على المزيد من المعلومات الرجاء عدم التردد في الإتصال على:

دانه محمد مكي البريد الكتروني: dana.maki@kcl.ac.uk الهاتف: 39469666

سنقوم بمقابلات جماعية لتحري إعتقادات المرضى عن ألم أسفل الظهر وتوقعاتهم حول برامج تثقيفيه للتعامل مع الألم. إذا أردت ان تعرف المزيد من المعلومات او المشاركة في البرنامج الرجاء ملىء الإستمارة وإعادتها للباحث:

الإسم: _____ رقم الهاتف:_____

البريد الإلكتروني:_____ العنوان: _____

_____

ماذا افعل في حالة حدوث مشكلة؟

إذا تسببت هذه الدراسة، بأي طريقة، بوضعك في موقف غير مفضل، يمكنك الإتصال بمشرف البحث د. دنكان كرتشلي بجامعة كنجز كولج لندن على التفاصيل المبينة ادناه:

Dr. Duncan Critchley
Academic Department of Physiotherapy/Division of Health and Social Care
School of Medicine
King's College London
Shepherd's House 3.18 Guy's Campus
London SE1 1UL
T: +0044 (0) 20 7848 6323
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Appendix 11: Arabic Roland-Morris Disability Questionnaire

استبيان رولاند موريس للاعاقة

عندما يؤلمك ظهرك، ربما ستجد بعض الصعوبات لتآديه المهام التي كنت تؤديها عادةً. تحتوي هذه القائمة على عبارات يستخدمها الأشخاص لوصف حالتهم عندما يشعرون بألم الظهر. عندما تقوم بقراءه هذه العبارات، ربما قد تجد بعضها مألوفاً لديك لانها تصف ما تشعر به اليوم.

عندما تقوم بقراءه هذه القائمة، فقط فكر بما تشعر به اليوم. اذا قمت بقراءه عبارة تصف حالتك اليوم، ضع علامة √ امامها. اذا كانت العبارة لا تصف حالتك اليوم، اترك الفراغ الذي امامها خالياً و انتقل للعبارة التالية.

تذكر: فقط ضع علامه امام العبارات التي انت متأكد من انها تصف حالتك اليوم.

- ☐ 1. أنا أبقي في المنزل معظم الوقت بسبب ظهري.
- ☐ 2. أنا اغير من وضعي بشكل متواصل للحصول على وضع مريح.
- ☐ 3. أمشي ببطئ أكثر من المعتاد بسبب ألم الظهر.
- ☐ 4. بسبب ظهري لم أقم بأي من الأعمال المنزلية كالمعتاد.
- ☐ 5. أستخدم قضبان اليد الجانبية للصعود على السلم بسبب ظهري.
- ☐ 6. بسبب ظهري أستلقي أكثر من المعتاد للحصول على الراحة.
- ☐ 7. بسبب ظهري، يجب علي أن امسك بشي ما للنهوض من علي الكرسي.
- ☐ 8. بسبب ظهري أحاول الحصول على مساعدة الآخرين للقيام ببعض الأعمال لي.
- ☐ 9. أرتدي ملابسي ببطئ أكثر من السابق بسبب ظهري.
- ☐ 10. أقف لفترات قصيرة فقط بسبب ظهري.
- ☐ 11. بسبب ظهري، أحاول عدم الانحناء او الاتكاء على ركبتي.
- ☐ 12. أواجه صعوبه للقيام من الكرسي بسبب ظهري.
- ☐ 13. ظهري مؤلم تقريباً طوال الوقت.
- ☐ 14 . اواجه صعوبة في التقلب في السرير بسبب ظهري.
- ☐ 15. شهيتي للاكل ضعيفه بسبب ألم ظهري.
- ☐ 16. أجد صعوبة في إرتداء الجوارب بسبب ظهري.
- ☐ 17. امشي لمسافات قصيرة فقط بسبب ظهري.
- ☐ 18. لا انام جيداً بسبب ظهري.
- ☐ 19. بسبب ألم ظهري، أرتدي ملابسي بمساعدة شخص آخر.
- ☐ 20. اجلس معظم اليوم بسبب ظهري.
- ☐ 21. أتجنب الأعمال المنزلية الشاقة بسبب ألم الظهر.
- ☐ 22. بسبب ألم ظهري، أنا سريع الغضب و عصبي مع الاخرين أكثر من السابق.
- ☐ 23. بسبب ظهري، أصعد السلم أبطي من المعتاد.
- ☐ 24. ألازم السرير أغلب الأحيان بسبب ظهري.

Appendix 12: Arabic Back Beliefs Questionnaire

معتقدات الم الظهر

من خلال هذا الاستبيان سنحاول معرفة ما يعتقد به الأشخاص عن مشكلة ألم أسفل الظهر. ارجو منكم ان تبدوا ارائكم بخصوص مشكلة ألم الظهر حتى ولو لم تعاني منها مطلقاً.

ارجو الاجابة على جميع الأسئلة مع بيان الموافقة او عدم الموافقة على كل عبارة بوضع دائره على الرقم المناسب الموجود في المقياس التالي. حيث يمثل رقم 1 ➔ لا اوافق مطلقاً ، و يمثل رقم 5 ➔ اوافق تماماً.

1
لا اوافق مطلقاً

5
اوافق تماماً

	لا اوافق				اوافق
1. لا يوجد علاج حقيقي لمشاكل الظهر.	1	2	3	4	5
2. مشاكل الظهر سوف توقفك في نهاية المطاف عن اداء عملك.	1	2	3	4	5
3. مشاكل الظهر تعني فترات من الالم تشعر بها مدى الحياة.	1	2	3	4	5
4. لايمكن للأطباء عمل اي شيء لمشاكل الظهر.	1	2	3	4	5
5. لتغلب على مشاكل الظهر عليك تمرينه.	1	2	3	4	5
6. مشاكل الظهر تجعل كل شيء في الحياة أسوأ.	1	2	3	4	5
7. الجراحة هي اكثر طريقة فعالة لمعالجة مشاكل الظهر.	1	2	3	4	5
8. مشاكل الظهر قد تعني بانه قد ينتهي بك الأمر لأستخدام كرسي متحرك.	1	2	3	4	5
9. العلاجات البديلة هي حل مشاكل الظهر.	1	2	3	4	5
10. مشاكل الظهر معناها فترات طويلة من الانقطاع عن العمل.	1	2	3	4	5
11. الادوية هي الحل الوحيد لتخفيف مشاكل الظهر.	1	2	3	4	5
12. بمجرد اصابتك بمشكلة في الظهر، فإن هذا يعني اصابتك بضعف دائم.	1	2	3	4	5
13. يجب توفير قسط من الراحه لمشاكل الظهر.	1	2	3	4	5
14. مع تقدم العمر سوف تسوء مشاكل الظهر تدريجياً.	1	2	3	4	5

Appendix 13: Arabic Coping Strategies Questionnaire

استراتيجيات التعامل مع الألم

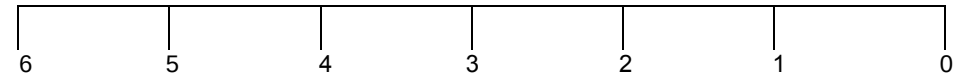
الأشخاص الذين يشعرون بالألم توصلوا لمجموعة من الطرق للتعود او التعامل مع الألم. هذه الطرق تتضمن قول عبارات معينة للنفس أثناء احساسهم بالألم، او الانشغال بنشاطات مختلفة. القائمه أدناه تضم أشياء ذكرها أشخاص عند إحساسهم بالألم. أريد منك أن تقوم بتقييم (بأستخدام المعيار المذكور ادناه) مدى قيامك بكل نشاط من الأنشطه المذكوره أدناه عند شعورك بالألم.

رقم 0 يدل على عدم ممارستك للنشاط. الرقم 3 يدل على قيامك بذلك النشاط بعض الأحيان و الرقم 6 يدل على قيامك بذلك النشاط دائما. تذكر يمكنك إختيار أي رقم يناسبك من المعيار المذكور وذكر ذلك الرقم بجانب النشاط.

	عندما أشعر بالألم	لا أزاول النشاط مطلقاً			زاولته بعض الأحيان			اقوم به دائماً
1	أحاول أن أبعد تفكيري عن الألم كما لو أنه كان في جسد شخص آخر.	0	1	2	3	4	5	6
2	أخرج من المنزل و اقوم بنشاطات أخرى كالذهاب للسينما او التسوق.	0	1	2	3	4	5	6
3	افكر بشيء يسعدني.	0	1	2	3	4	5	6
4	لا أفكر فيه كألم وإنما كشعور غير واضح لا أستطيع وصفه.	0	1	2	3	4	5	6
5	انه مزعج وأشعر بأنه لن يتحسن ابداً.	0	1	2	3	4	5	6
6	اقول لنفسي انني شجاع و استطيع المواصلة رغم الألم.	0	1	2	3	4	5	6
7	اقوم بالقراءة.	0	1	2	3	4	5	6
8	اقول لنفسي انني استطيع التغلب على الألم.	0	1	2	3	4	5	6
9	اقوم بتعداد الارقام او بالغناء ببالي.	0	1	2	3	4	5	6
10	اقوم بالتفكير به على انه شعور اخر، كالشعور بالتنمل.	0	1	2	3	4	5	6
11	انه مفزع واشعر انه يتغلب علي.	0	1	2	3	4	5	6
12	اشغل بالي لابعد تفكيري عن الألم.	0	1	2	3	4	5	6
13	اشعر بأن هناك لا داعي لمواصله حياتي.	0	1	2	3	4	5	6
14	أعلم بأن يوماً ما، شخص ما سيكون حولي لمساعدتي و سيذهب الالم لفترة معينة.	0	1	2	3	4	5	6
15	ادعي ربي لأن لا يستمر الألم طويلاً.	0	1	2	3	4	5	6
16	أحاول التفكير بانه ليس جسدي وكأنه شيء منفصل عني.	0	1	2	3	4	5	6
17	لا أفكر بالألم.	0	1	2	3	4	5	6
18	أحاول التفكير بالسنوات القادمة وكيف ستكون حياتي بعد التخلص من الألم.	0	1	2	3	4	5	6
19	اقول لنفسي أنه لا يؤلم.	0	1	2	3	4	5	6
20	اقول لنفسي، لا يمكنني ان اجعل الألم أن يقف عائقاً بيني وبين ما يجب علي القيام به.	0	1	2	3	4	5	6
21	لا أعيره أي أهتمام.	0	1	2	3	4	5	6
22	اثق بأن الأطباء سيجدون حلاً الألمي يوماً ما.	0	1	2	3	4	5	6
23	بغض النظر عن سوء الألم أعرف انه بأمكاني التعامل معه.	0	1	2	3	4	5	6
24	أتغاضى عن وجوده.	0	1	2	3	4	5	6
25	أقلق دائماً اذا ما كان سيزول.	0	1	2	3	4	5	6
26	أسترجع في مخيلتي ذكريات مسليه من السابق.	0	1	2	3	4	5	6
27	افكر بأشخاص استمتع بقضاء الوقت معهم.	0	1	2	3	4	5	6
28	أصلي من أجل أن يتوقف الألم.	0	1	2	3	4	5	6
29	أتخيل بأن الألم خارج جسدي.	0	1	2	3	4	5	6
30	أقوم بمواصلة حياتي كما لو لم يحدث شيء.	0	1	2	3	4	5	6
31	اراه كتحدي ولن أجعله يزعجني.	0	1	2	3	4	5	6
32	بالرغم من الألم أستمر.	0	1	2	3	4	5	6
33	أشعر بأني لا أستطيع التحمل أكثر.	0	1	2	3	4	5	6

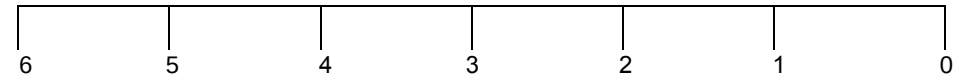
		لا أزاول النشاط مطلقاً			زوالته بعض الأحيان			اقوم به دائماً
34	أحاول أن أكون برفقة أشخاص آخرين.	0	1	2	3	4	5	6
35	أتجاهله.	0	1	2	3	4	5	6
36	أعتمد على ايماني بالله سبحانه و تعالى.	0	1	2	3	4	5	6
37	أشعر انني لا استطيع الاستمرار.	0	1	2	3	4	5	6
38	أفكر بأشياء أستمتع القيام بها.	0	1	2	3	4	5	6
39	أفعل أي شيء للتوقف عن التفكير في الألم.	0	1	2	3	4	5	6
40	أقوم بنشاط استمتع به، كمشاهدة التلفاز أو سماع الموسيقى.	0	1	2	3	4	5	6
41	أتظاهر أنه ليس جزء مني.	0	1	2	3	4	5	6
42	أقوم بنشاطات حيوية، كالأعمال المنزلية أو مشاريع اخرى.	0	1	2	3	4	5	6

بناء على الأشياء التي تقوم بها للتعامل والتغلب على الألم، في يومك المعتاد، ما هي قدرتك على السيطرة على الألم؟ الرجاء القيام بأختيار أكثر رقم
يناسبك من المعيار المذكورة أدناه. تذكر يمكنك إختيار أي رقم يناسبك من المعيار المذكور.



لا أملك أي سيطرة بعض السيطرة سيطرة كاملة

بناء على الأشياء التي تقوم بها للتعامل والتغلب على الألم، في يومك المعتاد، ما هي قدرتك على تخفيف الألم؟ الرجاء القيام بأختيار أكثر رقم يناسبك من المعيار المذكورة أدناه. تذكر يمكنك إختيار أي رقم يناسبك من المعيار المذكور.



لا أملك أي سيطرة بعض السيطرة سيطرة كاملة

Appendix 14: Socio-demographic and clinical characteristics questionnaire

Please complete all questions to the best of your ability.

Age: _____ Gender: □ Male □ Female

What is your marital status?

□ Never married
□ Married
□ Separated, but still legally married
□ Divorced
□ Widowed

Which of the following best describes your educational background?

□ Elementary schooling □ Secondary schooling □ Graduate diploma

□ University graduate □ Post-graduate (masters, professional or equivalent)
□ Doctoral (PhD, or equivalent) □ None

Which of the following best describes your job?

□ Unemployed
□ Medical / healthcare professional
□ Civil servants (ministries)
□ Sciences
□ TV and media
□ Engineering and construction
□ Retired
□ Student
□ Housewife
□ Banking and financial services
□ Teaching and education
□ Military
□ IT and computing services
□ Beauty, health and fitness
□ Manual labour
□Self employed
□ Other, please identify:
_____

How long have you had back pain for?

□ 3 – 6 months
□ 7 months to 1 year
□ 1 to 2 years
□ 3 years
□ 4 to 5 years
□ 6 to 10 years
□ 11 to 15 years
□ 16 to 20 years
□ More than 20 years

What do you think was the reason for your low back pain?

□ Gradual
□ Car accident
□ Work-related injury or accident
□ Other type of accident
□ Sports-related injury
□ Carrying a heavy load
□ Overweight
□ Not sure
□ Other, please specify: _____

Appendix 15: Information sheet for participation in the focus groups

INFORMATION SHEET FOR PARTICIPANTS

King's College Research Ethics No. BDM/12/13-36

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Study title:

"Determining the biopsychosocial factors associated with LBP disability in the Arab population of Bahrain"

Focus groups to investigate patients' beliefs regarding their lower back pain (LBP) and their expectations of a LBP Pain Management Program

We would like to invite you to participate in this original postgraduate research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important to you to understand why the research is being done and what your participation will involve.

Please take the time to read the following information carefully and discuss it with others if you wish. Feel free to ask any questions or for further information.

Who is funding and sponsoring this research?
This work forms part of a PhD study, which is being undertaken at King's College London. The sponsor is King's College London, and the Crown Prince International Scholarship Program of Bahrain is funding the research.

Who has reviewed this study?
The study has been reviewed and approved the by the King's College London Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee ***(BDM/12/13-36)***.

What is the purpose of this study?
Low back pain (LBP) is a very common condition. It can lead to a variety of problems including difficulty with daily activities, walking, sleeping, mood changes or our relationships with others. We know that in some people back pain gets better, and in others it persists for long periods of time. As you may know there are different ways to manage LBP, one of which is through physiotherapy. Physiotherapy methods that help with LBP include "hands-off" approach, where patients are enabled to deal with their LBP by understanding pain, modifying behaviours, mood and improving coping. These methods can be delivered through Pain Management Programs, where a physiotherapist teaches a group of patients with back pain how to cope. To this date, little is known about what the Bahrainis know about back pain, what they think about it and how they cope. Therefore, we are undertaking these focus groups to gain an in-depth understanding of your LBP experiences and beliefs, and what are your expectations as a LBP patient from a Pain Management Program.

What will happen to me if I take part?
On arrival, the researcher will explain the study to you and you will be asked to sign a consent form for participation and audio-taping. In the focus group, you will be asked questions about your views on LBP, your understanding of LBP, how you cope with LBP and how LBP affects you. In the second part of the interview you will be asked about your thoughts regarding a Pain Management Program delivered by physiotherapists. We are interested in your opinions, views and experiences and there are no wrong or right answers to these questions. The interviews are not meant to judge your level of knowledge, your experiences or the type of treatment you are relieving. Whilst every effort has been made to ensure the confidentiality of the focus groups discussions, it is not possible to guarantee that these discussions will be kept strictly confidential.
Apart from time commitment, no preparation for the interview is necessary. During the interview, you can choose not to answer questions or to end your participation at any time without giving a reason. You can withdraw from the study

at any time, but due to the interdependent nature of focus groups it may not be possible to remove their ideas and views expressed in the discussion from the study.

What would be involved?
The researcher or a physiotherapist will explain the study to you. The researcher will then contact you a day later to ask you if you would like to participate. You will be given a time and a date to attend a focus group session at your out-patients physiotherapy clinic. You will be in a group of minimum 4 participants and a maximum of 8 participants. The focus group will be conducted by the research student. We will discuss some of the points mentioned above. Finally we will ask about your opinion regarding a Pain Management Program. We would like you to feel comfortable while participating; if you feel uncomfortable for any reason let us know. You will be provided with refreshments during the session. The interview will last between approximately 1 to 1.5 hours. The interview will be audio-taped so we can have a record of what was discussed. The discussion contents will be transcribed and used for research purposes only. No information will be passed back to your hospital about your participating. You will not be named in any part of the research. Your name will be replaced with a code that indicates your participation and you will not be identifiable. The transcript will only be read and used by the research team. It may also be used as material for academic articles. The results of the study may be presented at national or international conferences or published in scientific journals. You will be unidentifiable. You will be able to listen to a summary of the discussion contents at the end of the session if you wish, and we could send you a report.

Are there any disadvantages in taking part?
There are no anticipated disadvantages or physical risks to participants.

Will everything you say in the interview be kept confidential?
The researched will keep everything that is said during the discussion confidential. Whilst every effort has been made to ensure the confidentiality of the focus groups discussions, it is not possible to guarantee that these discussions will be kept strictly confidential. You should be comfortable with the amount of information you decide to give. The recorded discussions will be saved and protected in a secure place at King's College London.

If you decide to take part in this study, you will be asked to sign a consent form to clarify your agreement to participate and to be audiotaped. Signing a consent form is required prior to participating in the focus group. Signing consent form does not mean you have to continue your participation to the end of the focus group session. You will be given a copy of the consent form to keep and another copy will be kept for our records. Your signature indicates that you are agreeing to participate in this study and that you have given permission to be audiotape recorded during the interview.

You can withdraw at any time without giving a reason. A decision not to participate or withdrawal from the study will not affect the care you receive at your hospital. You can withdraw from the study at any time, but due to the interdependent nature of focus groups it may not be possible to remove their ideas and views expressed in the discussion from the study.

Should you need more detail, please do not hesitate to contact:
Dana Maki
Email: dana.maki@kcl.ac.uk
Tel: 39469666

What if there is a problem?
If this study has disadvantaged you in any way you can contact King's College London using the details below for further advice and information:

Dr. Duncan Critchley
Academic Department of Physiotherapy / Division of Health and Social Care
School of Medicine
King's College London
Shepherd's House 3.18
Guy's Campus
London SE1 1UL, United Kingdom
Email: duncan.critchley@kcl.ac.uk
T: +0044 (0)20 7848 6323
F: +0044 (0)20 7848 6325

لائحة المعلومات للمشاركين في المقابلات الفرديه

سيتم منحك نسخة من هذه اللائحة للاحتفاظ بها

مقابلات جماعية لتحري إعتقادات المرضى عن ألم أسفل الظهر وتوقعاتهم حول برامج تثقيفيه للتعامل مع الألم

نود ان ندعوك للمشاركة في هذا البحث لرسلة دكتوراه. مشاركتك في هذا البحث اختياريه فيمكنك المشاركه اذا رغبت بذلك. لن يترتب على مشاركتك او عدمها اي تفضيل او تميز. نرجو منك اخذ وقتك في قراءه هذه اللائحة بتعنٍ و قم بمناقشتها مع الاخرين لادراك اهمية مساهمتك قبل اتخاذ قرارك. واذا اردت اية ايضاحات او رغبت في معلومات اضافية فالرجاء الاتصال بالباحث.

تمويل و رعاية هذا الإستبيان:

هذا الإستبيان هو جزء من رسالة دكتوراة في جامعة كنجز كولج لندن King's College London فالراعي هو جامعة كنجز كولج لندن King's College London والممول لهذا الإستبيان برنامج ولي عهد للمنح الدراسيه العالمية.

من قام بمراجعة هذه الدراسة؟

لقد تم مراجعة وموافقة لجنة مبادئ البحوث في جامعة كنجز كولج لندن King's College London.

ماهو الغرض من هذه الدراسة؟

ألم اسفل الظهر ظاهرة منتشرة ويمكن أن تسبب مشاكل عديدة وعوارض جانبيه منها التأثير على الأنشطة اليومية والمشي والنوم وراحة البال والعلاقات مع الآخرين. ومن المعروف في الطب أن هناك من يتحسن وهناك من يعاني من الألم لسنين عدة ولفترات طويلة، وكما نعلم ان هناك طرق مختلة لمكافحة ألم أسفل الظهر ومنها العلاج الطبيعي.

تتضمن اساليب العلاج الطبيعي لمكافحة ألم أسفل الظهر إساليب "لتمكين المريض" وذلك عن طريق تمكين المرضى للتعامل مع الألم عن طريق استيعاب معنى الألم وتغير السلوكيات اليوميه وتحسين قدرتهم على التأقلم. ويمكن الحصول على هذه المعلومات عبر المشاركة في برامج تثقيفيه للتعامل مع الألم. عادة يتم توفير هذه البرامج لمجموعه من المرضى الذين يعانون من ألم أسفل الظهر تحت ارشاد أخصائي علاج طبيعي. ولنجاح هذا البرنامج فإننا بحاجه لمعلومات حول اعتقادات وآراء الشعب البحريني حول ألم أسفل الظهر. ولغاية هذا اليوم هناك القليل من المعلومات عما يعرفه البحرينيون عن ألم أسفل الظهر ومايعتقدونه عنه وكيف يتعايشون معه.

ما هو المتوقع مني إذا إشتركت؟

ستقوم بتعبية إستبيان لجمع معلومات إجتماعية اساسيه كالعمر ونوع الجنس و مستوى التعليم والعمل والحالة الإجتماعية...إلخ.

في الجزء الثاني من المقابلة سيتم سؤالك وسؤال المجموعة التي معاك من قبل أخصائي العلاج الطبيعي عن آرائك في برامج تثقيفيه للتعامل مع ألم أسفل الظهر. وسيطلب منك الإيضاح والتعبيرعن آرائك. نحن مهتمون لسماع آرائك ووجه نظرك وتجاربك، وليس هناك أجابات صحيحة أو مفضله. ليس من هدف المقابلات الحكم على مستوى معرفتك أو خبرتك أو نوع العلاج الذي تستلمه وليس هناك حاجة للتحضير للمقابلة، فقط نريد جزء من وقتك.

خلال هذه المقابلة يمكنك عدم الإجابة على الأسئلة أو إنهاء مشاركتك دون الحاجة الى التفسير. إذا قررت المشاركة في هذه الدراسة سنقوم بتحديد الوقت والمكان المناسب للمقابلة.

ماهي الإجراءات؟

إذا قررت المشاركة سنحدد الوقت والمكان المناسب للمقابلة. سيقوم بعدها الباحث بمقابلتك من ضمن مجموعة 4 إلى 8 مرضى أخرين، وسنقوم بمناقشة آرائك بخصوص البرامج التثقيفيه للتعامل مع الألم. نريدك أن تشعر بالراحة خلال مشاركتك وإذا شعرت بعدم الراحة في أي وقت فعليك إعلامنا بذلك.

سنوفر لك المرطبات خلال المقابلة والذي تتراوح مدتها ما بين 30 و 45 دقيقة كما سيتم تسجيل المقابلة صوتياً لنتمكن من الإحتفاظ بسجلات النقاش وسيتم طباعة محتوى النقاش لإستخدامه لإغراض البحث فقط. لن يتم إعطاء أي من معلومات مشاركتك للمستشفى او

العيادة التي تتردد عليها ولن يتم الاشاره الى هويتك في أي جزء من أجزاء البحث. سيتم إستبدال إسمك برمز يدل على مشاركتك وليس على هويتك. سيقرأ التحليل فقط فريق البحث في جامعة كنجز كولج لندن King's College London. وقد يتم كتابة ونشر هذه التحليلات في البحوث الطبية العالمية او المحلية من دون الإشارة اليك كفرد او مشارك معين.

ستتمكن من الإستماع لملخص النقاش في نهاية مقابلتك، إن اردت ذلك، ونستطيع أن نرسل لك التقرير.

هل هناك أي سلبيات لمشاركتي؟

ليس هناك أي سلبيات متوقعة أو مخاطر من المشاركه.

هل سيتم الإحتفاظ بجميع المعلومات المعطاة بشكل سري؟

سيقوم الباحث بالإحتفاظ بماقيل خلال المناقشة بشكل سري. نود منك أن تكون مرتاح من طبيعة وكمية المعلومات التي ستشارك بها. سيتم حفظ المناقشات المسجلة في منطقة مقفلة في جامعة كنجز كولج لندن. وكذلك نطلب منك الإحتفاظ بخصوصيات باقي المرضى المشاركين في المقابلة.

إذا قررت المشاركة في هذه الدراسة سيتم الطلب منك التوقيع على إفادة بالموافقة على مشاركتك وبيان موافقتك على التسجيل الصوتي. كما سنطلب منك توقيع الإفادة قبل بدء المقابلة.

لا يلزمك توقيعك على هذه الإفادة لمواصلة المشاركة إلى نهاية المقابلة.

ستحصل على نسخة من إفادة الموافقة و سنقوم بالإحتفاظ بنسخة لسجلاتنا.

يمكنك الإنسحاب من المشاركة في اي وقت دون إعطاء أي سبب. قرارك بعدم المشاركة أو الإنسحاب لن يؤثر في الرعاية او المعامله التي تحصل عليها في العيادة التي تزورها. عند انسحابك من المقابلة قد يكون حذف مشاركتك من التسجيل صعباً بسبب طبيعة المقابلة الجماعية.

للحصول على المزيد من المعلومات الرجاء عدم التردد في الإتصال على:

دانه محمد مكي البريد الكتروني: dana.maki@kcl.ac.uk الهاتف: 39469666

ماذا أفعل في حالة حدوث مشكلة؟

إذا تسببت هذه الدراسة، بأي طريقة، بوضعك في موقف غير مفضل، يمكنك الإتصال بمشرف البحث د. دنكان كرتشلي بجامعة كنجز كولج لندن على التفاصيل المبينة ادناه:

Dr. Duncan Critchley
Academic Department of Physiotherapy/Division of Health and Social Care
School of Medicine
King's College London
Shepherd's House 3.18 Guy's Campus
London SE1 1UL United Kingdom
T: +0044 (0) 20 7848 6323
F: +0044 (0) 20 7848 6325

Appendix 16: Consent forms for participation in the focus groups

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

King's College Research Ethics No. BDM/12/13-36

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Study title:

"Determining the biopsychosocial factors associated with LBP disability in the Arab population of Bahrain"

Focus groups to investigate patients' beliefs regarding their lower back pain (LBP) and their expectations of a LBP Pain Management Program

The study has been reviewed and approved the by the King's College London Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee *(**BDM/12/13-36**)*.

The person organising the research must explain the project to you before you agree to take part. If you have any questions regarding the Information Sheet or explanation, please ask the researcher before you make a decision on your participation. You will be given a copy of this Consent Form for your private records.

Please initial each statement to confirm your understanding:

I understand that if I choose to terminate my participation in this project, I can notify the researchers involved and withdraw from this study immediately without giving any reason. Furthermore, I understand that due to the interdependent nature of focus groups it may not be possible to remove their ideas and views expressed in the discussion from the study. (see Information Sheet) . ☐

Discussions in the focus groups are confidential and this must be maintained by participants. ☐

I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998. ☐

I consent to taking part in this study as well as I have given permission to be audiotape recorded during the interview. ☐

Participant's Statement:

I _____

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed **Date**

Name of the Relative / witness

Signed **Date**

Name of Person taking consent

Signed **Date**

AUDIO-RECORDING CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

King's College Research Ethics No. BDM/12/13-36

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Study title:

"Determining the biopsychosocial factors associated with LBP disability in the Arab population of Bahrain"

Focus groups to investigate patients' beliefs regarding their lower back pain (LBP) and their expectations of a LBP Pain Management Program

The study has been reviewed and approved the by the King's College London Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee ***(BDM/12/13-36)***.

AUDIO-RECORDING CONSENT FORM

If a company, University or College wants to make any audio-recordings for research purposes they must first ask your permission. This is called consent.

King's College London needs to have this consent to enable it to keep the recording until after transcription, at which point it will be securely destroyed.

When you sign the form you grant King's College London the rights to the recording and to allow it to use it for research.

It is up to you to make sure you have sufficient information. Please read the consent form and feel free to ask any questions you have before signing.

Please complete this form after you have read the above information and/or listened to an explanation about the research.

Contribution: Audio-recording for research purposes

NAME OF PARTICIPANT_____

SIGNATURE OF PARTICIPANT_____

DATE OF RECORDING_____

NAME OF RESEARCHER _____

SIGNATURE OF RESEARCHER_____

إفادة الموافقة على المقابلة مع التسجيل الصوتي

إفادة الموافقة للمشاركين في البحث الدراسي

الرجاء تعبئة هذه الإستمارة بعد قراءة لائحة المعلومات أو الاستماع إلى إيضاحات عن هذا البحث.

عنوان الدراسة: مقابلات جماعية لتحري إعتقادات المرضى عن ألم أسفل الظهر وتوقعاتهم حول برامج تثقيفيه للتعامل مع الألم

رقم موافقة لجنة المبادئ بجامعة كنجز كولج لندن: BDM/12/13-36

- شكرا لإبداء رغبتك بالمشاركة في هذا البحث ومن الواجب أن يقوم الباحث المسؤول عن البحث بشرح المشروع قبل أن توافق على المشاركة.

- إذا كانت لديك أي أسئلة بعد قرائك للائحة المعلومات واستماعك للشرح، الرجاء الاستفسار قبل موافقتك على المشاركة.

- سيتم إعطائك نسخة من إفادة الموافقة للإحتفاظ بها والرجوع إليها في أي وقت.

البيان	التوقيع
أعلم بأنه إذا قررت في أي وقت خلال البحث أن أتوقف عن المشاركه يمكنني إعلام الباحثين المنسقين والإنسحاب دون إبداء أي اسباب. أعلم انه من الصب حذف مشاركتي من التسجيل بسبب طبيعة المقابلات الجماعية.	
المناقشة في المقابلة سرية وعليّ الإحتفاظ بمعلومات وخصوصيات المشاركين الأخرين.	
اعطي موافقتي لإستخدام معلوماتي للأسباب التي ذكرت لي وأعلم بأنه سيتم حفظ والتعامل مع المعلومات بالطريقه التي ذكرت في قانون حمايه المعلومات لعام 1998	
أوافق على الإشتراك في هذه الدراسة واعطي هنا موافقتي على التسجيل الصوتي خلال المقابله	

تصريح المشترك

أنا _____

اوافق بأن البحث المذكور أعلاه قد تم شرحه لي كما اوافق على المشاركة في هذه الدراسة. لقد قمت بقراءة كل من لائحة المعلومات عن البحث وأفهم كل مايتضمنه هذا البحث.

التوقيع_____ التاريخ_____

إسم الشخص الذي أخذ الإفادة

_____

التوقيع_____ التاريخ_____

إفادة الموافقة على التسجيل الصوتي للمشاركين في البحث الدراسي

إفادة الموافقة للمشاركين في البحث الدراسي

الرجاء تعبئة هذه الإستمارة بعد قراءة لائحة المعلومات أو الاستماع إلى إيضاحات عن هذا البحث.

عنوان الدراسة: مقابلات جماعية لتحري إعتقادات المرضى عن ألم أسفل الظهر وتوقعاتهم حول برامج تثقيفيه للتعامل مع الألم

رقم موافقة لجنة المبادئ بجامعة كنجز كولج لندن: BDM/12/13-36

إفادة الموافقة على التسجيل الصوتي

إذا ارادت أي شركة أو جامعة أن تقوم بالتسجيل الصوتي لغرض البحث لابد أن تقوم بالحصول على موافقتك. تحتاج جامعة كنجز كولج لندن الحصول على هذه الإفادة لتستطيع الإحتفاظ بالتسجيل حتى مرحلة توثيق المعلومات وبعد ذلك ستقوم بالتخلص من التسجيل بشكل آمن.

بتوقيعك على هذه الإفادة ستسمح للجامعة بالتسجيل وإستخدامه لأغراض البحث فقط.

ترجع لك مسؤلية التأكد من السؤال وقرأه لائحة المعلومات للحصول على المعلومات التي قد تحتاجها.

الرجاء ملئ هذه الإفادة بعد أن تكون قرأت المعلومات المذكورة أعلاه أو أستمعت لشرح عن هذا البحث.

الإشتراك: التسجيل الصوتي لأغراض البحث

إسم المشترك _____

توقيع المشترك _____

تاريخ التسجيل _____

إسم الباحث _____

توقيع الباحث _____

Appendix 17: Ethical Approval from King's College London (BDM/13/14-45)

Research Ethics Office

5.11 Franklin Wilkins Building
(Waterloo Bridge Wing)
Stamford Street
London SE1 9NH
Tel 020 7848 4077/4070/3758
Email rec@kcl.ac.uk
www.kcl.ac.uk/research/ethics

KING'S College LONDON

Dana Maki
3.11 Shepherd's House
Guy's Campus
King's College London
London SE1 1UL

19 December 2013

Dear Dana

BDM/13/14-45 Physiotherapist-led pain management programme for Low Back Pain in Bahrain: a feasibility study.

Review Outcome: Full Approval

Thank you for submitting the above application which the **BDM RESC** considered at our meeting on **13 December 2013**. I am pleased to inform you that these meet the requirements of the BDM RESC and therefore that full approval is now granted with the following provisos:

1. Section 2.2 and 2.3: Please note that ethical approval for PhD studies is normally granted for a period of three years.
2. Section 6.3: Provide more information about the approaches that will be made to participants. Please email rec@kcl.ac.uk, quoting your research ethics reference number on all correspondence.
3. Section 7.1: The Committee recommends that participants are allowed at least 24 hours to consider whether to participate.
4. Information Sheets:
   I. Clarify that you are the Principal Investigator. Please email rec@kcl.ac.uk, quoting your research ethics reference number on all correspondence.
   II. Please note it is your responsibility to ensure the accuracy of any translations of the recruitment documents. If a translator is used please list their details under Section 1.4 and ensure they sign a confidentiality agreement.
   III. You should only provide the contact details for you and your supervisor.
5. Please avoid repetition of the text of the email throughout the application.

Note that you should submit a response to the above provisos where specified; it is a condition of the approval granted by the BDM RESC that the provisos are carried out prior to the study commencing. If the provisos are not adhered to, the approval granted by the BDM RESC would no longer be valid. Should you have any queries on this please do not hesitate to contact the Research Ethics Office.

Please ensure that you follow all relevant guidance as laid out in the King's College London Guidelines on Good Practice in Academic Research (http://www.kcl.ac.uk/college/policyzone/index.php?id=247).

For your information ethical approval is granted until **16 December 2016**. If you need approval beyond this point you will need to apply for an extension to approval at least two weeks prior to this explaining why the extension is needed, (please note however that a full re-application will not be necessary unless the protocol has changed). You should also note that if your approval is for one year, you will not

be sent a reminder when it is due to lapse.

Ethical approval is required to cover the duration of the research study, up to the conclusion of the research. The conclusion of the research is defined as the final date or event detailed in the study description section of your approved application form (usually the end of data collection when all work with human participants will have been completed), not the completion of data analysis or publication of the results. For projects that only involve the further analysis of pre-existing data, approval must cover any period during which the researcher will be accessing or evaluating individual sensitive and/or un-anonymised records. Note that after the point at which ethical approval for your study is no longer required due to the study being complete (as per the above definitions), you will still need to ensure all research data/records management and storage procedures agreed to as part of your application are adhered to and carried out accordingly.

If you do not start the project within three months of this letter please contact the Research Ethics Office.

Should you wish to make a modification to the project or request an extension to approval you will need approval for this and should follow the guidance relating to modifying approved applications:
http://www.kcl.ac.uk/innovation/research/support/ethics/applications/modifications.aspx
The circumstances where modification requests are required include the addition/removal of participant groups, additions/removal/changes to research methods, asking for additional data from participants, extensions to the ethical approval period. Any proposed modifications should only be carried out once full approval for the modification request has been granted.

Any unforeseen ethical problems arising during the course of the project should be reported to the approving committee/panel. In the event of an untoward event or an adverse reaction a full report must be made to the Chair of the approving committee/review panel within one week of the incident.

Please would you also note that we may, for the purposes of audit, contact you from time to time to ascertain the status of your research.

If you have any query about any aspect of this ethical approval, please contact your panel/committee administrator in the first instance (http://www.kcl.ac.uk/innovation/research/support/ethics/contact.aspx). We wish you every success with this work.

With best wishes

Yours sincerely

Catherine Fieulleteau
Senior Research Ethics Officer
For and on behalf of
Dr Heidi Lempp, Deputy Chair
Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee (BDM RESC)

Cc: Dr Duncan Critchley

Appendix 18: Ethical Approval from Ministry of Health, Bahrain (EF/HM/1070/2014)

KINGDOM OF BAHRAIN
Ministry of Health
Office of Assistant
Undersecretary for Training
& Planning

مملكة البحريـــن
وزارة الصحـــة
مكتب الوكيل المساعد للتدريب
والتخطيط

No: EF/HM/1070/2014
Date: 17/03/2014

To: Dana Maki
PhD student,
King's College London

Subject: Letter of Approval for Research Proposal:

"Physiotherapist-led pain management program for Low Back Pain: a feasibility study."

Dear Ms. Dana,

Thank you for submitting your clarifications and revised research proposal documents, which has been considered by members of the MoH Research Technical Support Team (RTST) on 13 March 2014.

We would like to inform you that the team found no major ethical issues or methodological problems that would hinder the conduct of this study. We are hence pleased to approve the above application.

Please note that this approval is subject to the following conditions:

1. We expect that the study will begin within 6 months of the date of this approval.
2. **Approval from a MoH Research Committee does not automatically imply that the researcher is granted access to data, medical records or biological samples from MoH healthcare facilities.** Researchers must seek permission and follow procedures as dictated by the concerned departments after presenting them with a valid MOH approval letter.
3. Any significant change, which occurs in connection with this study and/or which may alter its ethical consideration, must be reported immediately to the RTST.
4. This approval is valid for up to **1 year** from the date of approval. If the study extends beyond this date, a progress report must be sent to the RTST to renew the approval.
5. The RTST must be informed when the research has been completed and a copy of the final research report must be submitted for our records.

We wish you all the best in this study.

Yours sincerely,

Dr. Hala Ebrahim Al-Mehza
Chairperson, Research Technical Support Team
Assistant Undersecretary for Training and Planning

CC:
- Team file

Tel. 17286040 - Fax (973) 17286041 (973)17286041 فاكس - 17286040 هاتف
Email: HMehza@health.gov.bh

Appendix 19: information sheet for participating in the pain management programme

INFORMATION SHEET FOR PARTICIPANTS

King's College Research Ethics No. BDM/13/14-45

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Study title:

Physiotherapist-led pain management programme for Low Back Pain in Bahrain: a feasibility study

We would like to invite you to participate in this original postgraduate research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important to you to understand why the research is being done and what your participation will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Feel free to ask any questions or for further information.

Who is funding and sponsoring this research?
This work forms part of a PhD study, which is being undertaken at King's College London. The sponsor is King's College London, and the Crown Prince International Scholarship Programme of Bahrain is funding the research.

Who has reviewed this study?
The study has been reviewed and approved the by the King's College London Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee *(**BDM/ 13/14-45**)*.

What is the purpose of this study?
Low back pain (LBP) is a very common condition. It can lead to a variety of problems including difficulty with daily activities, walking, sleeping, mood changes or our relationships with others. We know that in some people back pain gets better, and in others it persists for long periods of time. As you may know there are different ways to manage LBP, one of which is through physiotherapy. Physiotherapy methods that help with LBP include a cognitive-behavioural approach, where patients are enabled to deal with their LBP by understanding pain, modifying behaviours, mood and improving coping. These methods can be delivered through Pain Management Programs, where a physiotherapist teaches a group of patients with back pain how to cope better and become more active. To date, we have conducted questionnaire-based studies and group interviews with over 250 low back pain patients in Bahrain to find out what they know about back pain and how they cope with it. We are now able to better understand how you deal with low back pain. Previous research has suggested that Pain Management Programmes can help people with low back pain help themselves and become more active. Therefore, we are undertaking this study to see if a Pain Management Programme is appropriate to Bahraini patients.

What will happen to me if I take part?
The study will take place over several parts. You will be assessed at the beginning and attend a 3 week Pain Management Programme at Salmaniya Medical Complex – outpatient physiotherapy department. After the programme you will be assessed immediately, at 3 months and 6 months of completion. We would like to collect data at 3 and 6 months to help us determine whether the programmes effective in the long-term. You are able withdraw from the study at any point without the need for explanation. Apart from time commitment, there is no preparation expected from you for any parts of the study.

What is the Pain Management Programme?
Aims of the Programme

The programme aims to reduce the low moods, unhelpful beliefs experienced by chronic LBP patients. This includes lowering catastrophising of LBP symptoms; fear of movement and re-injury; improve strength; increase activities at home and in society; encourage an individual to cope independently during periods of increased pain.

Structure of the Programme

The Pain Management Programme consists of three times weekly sessions each of 60 minutes duration over a 3-week period. The 9 sessions are each divided into education/discussion for 40 minutes and 20 minutes of exercise and/or relaxation. The maximum number of subjects in a group is 12. Sessions are led by a physiotherapist with support from the principal investigator (PI) Dana Maki and/or physiotherapy assistant. Participants will be provided with an accompanying course manual, which contains all theoretical and physical components of the course.

What would be involved?

The details of the study are as follows:

1. Your physiotherapist would have selected you based on the study's inclusion and exclusion criteria and gave you this information sheet.
2. The PI, Dana Maki, will contact you about a day or two later to ask you if you would like to participate in the study.
3. The PI will meet with you and explain the study to you. You will be asked to sign a consent form to participate in the study. On this instance, you will also fill out a battery of questionnaires that includes questions about socio-demographic factors, disability, pain, your beliefs about back pain, how you cope with back pain, and your depression and anxiety levels. This will take approximately 25 to 35 minutes.
4. You will then attend either a male or female-only Pain Management Programme. The group is expected to have 6 to 12 participants. The programme will consist of 3 1-hour sessions for 3 weeks (total of 9 sessions).
5. At the end of the programme you will be asked to fill out the questionnaires again.
6. You will be contacted at 9 to 10 weeks to be invited to fill out the questionnaires again at 12 weeks (3 months point).
7. Finally, you will be contacted at 5½ months after the end of the programme to be invited to fill out the questionnaires again at 6 months.

Are there any disadvantages in taking part?

There are no anticipated disadvantages or physical risks to participants.

Will everything you say in the interview be kept confidential?

The PI will keep everything that is said during the discussion confidential. Whilst every effort has been made to ensure the confidentiality of the group's discussions that take place during the program, it is not possible to guarantee that these discussions will be kept strictly confidential. You should be comfortable with the amount of information you decide to give.

The questionnaires that you will fill out at different points of the study will be locked securely at Aahlia University Bahrain. They will be coded, and codes that could potentially identify you will be placed in a separate lockable filling cabinet at the university. Only the PI will have access to the codes.
The recorded interviews will also be coded. They will be saved and protected in a secure place at King's College London.

No information will be passed back to your hospital about your participation. You will not be named in any part of the research. Your name will be replaced with a code that indicates your participation and you will not be identifiable. The interview transcripts will only be read and used by the research team. It may also be used as material for academic articles. The results of the study may be presented at national or international conferences or published in scientific journals. However, you will be unidentifiable.

If you decide to take part in this study, you will be asked to sign a consent form to clarify your agreement to participate and to be audiotaped. Signing a consent form is required prior to participating. Signing consent form does not mean you have to continue your participation to the end of the study. You will be given a copy of the consent form to keep and another copy will be kept for our records. Your signatures will indicate that you are agreeing to participate in the respective parts of the study.

You can withdraw at any time without giving a reason. A decision not to participate or withdrawal from the study will not affect the care you receive at your hospital. You can withdraw from the study at any time. If you wish to withdraw your questionnaire-based data from the study, you need to notify the research team by 03 April 2015.

Should you need more detail, please do not hesitate to contact the principal investigator (PI):

Dana Maki Email: dana.maki@kcl.ac.uk Tel: 39469666

What if there is a problem?
If this study has disadvantaged you in any way you can contact King's College London using the details below for further advice and information:

Dr. Duncan Critchley
Academic Department of Physiotherapy / Division of Health and Social Care
School of Medicine, King's College London
Shepherd's House 3.18, Guy's Campus
London SE1 1UL, United Kingdom
Email: duncan.critchley@kcl.ac.uk
T: +0044 (0)20 7848 6323
F: +0044 (0)20 7848 6325

Or you could contact Dr. Ebrahim Rajab in Bahrain:

Dr. Ebrahim Rajab
Department of Physiotherapy
College of Medical and Health Sciences
Ahlia University
Bahrain
Email: erajab@ahlia.edu.bh
T: 00973-38804939

لائحة المعلومات للمشاركين

سيتم منحك نسخة من هذه اللائحة للاحتفاظ بها

دراسة جدوى: برنامج ثقافي للتعامل مع ألم أسفل الظهر المزمن بقيادة أخصائي العلاج الطبيعي

نود ان ندعوك للمشاركة في هذا البحث لرسلة دكتوراه. مشاركتك في هذا البحث اختياريه فيمكنك المشاركه اذا رغبت بذلك. لن يترتب على مشاركتك او عدمها اي تفضيل او تميز. نرجو منك أخذ وقتك في قراءه هذه اللائحة و قم بمناقشتها مع الاخرين لإدراك قيمه مساهمتك قبل اتخاذ قرارك. واذا اردت اية ايضاحات او رغبت في معلومات اضافية فالرجاء الاتصال بالباحث.

تمويل و رعاية هذه الدراسه:

هذا البحث جزء من رسالة دكتوراة في جامعة كنجز كولج لندن King's College London فالراعي هو جامعة كنجز كولج لندن King's College Londonوالممول لهذا الإستبيان برنامج ولي عهد للمنح الدراسيه العالمية.

من قام بمراجعة هذه الدراسة؟

لقد تم مراجعة وموافقة لجنة مبادئ البحوث والتراخص بوزارة الصحة فب البحرين رقم: EF/HM/1070/2014 وفي جامعة كنجز كولج لندن King's College London. وصدر بيان الموافقه تحت رقم (45-13/14 /BDM).

ماهو الغرض من هذه الدراسة؟

ألم اسفل الظهر ظاهرة منتشرة ويمكن أن تسبب مشاكل عديدة وعوارض جانبيه منها التأثير على الأنشطة اليومية والمشي والنوم وراحة البال والعلاقات مع الآخرين. ومن المعروف في الطب أن هناك من يتحسن وهناك من يعاني من الألم لسنين عدة ولفترات طويلة، وكما نعلم ان هناك طرق مختلة لمكافحة ألم أسفل الظهر ومنها العلاج الطبيعي.

تتضمن اساليب العلاج الطبيعي لمكافحة ألم أسفل الظهر إساليب "لتمكين المريض" وذلك عن طريق تمكين المرضى للتعامل مع الألم عن طريق استيعاب معنى الألم وتغير السلوكيات اليوميه وتحسين قدرتهم على التأقلم. ويمكن الحصول على هذه المعلومات عبر المشاركة في برامج تثقيفيه للتعامل مع الألم. عادة يتم توفير هذه البرامج لمجموعه من المرضى الذين يعانون من ألم أسفل الظهر تحت ارشاد أخصائي علاج طبيعي.

لقد أجريت دراسات ومقابلات جماعية مع أكثر من 250 مريض بألم أسفل الظهر في البحرين لتحري ما يعرفونه عن ألم أسفل الظهر وكيف يتعاملون معه. على إثر هذه المستجدات توكنت لدينا معلومات جيده عن حياة ومشاكل المرضى. بالإضافه إلى ذلك، اقترحت البحوث السابقة أن برامج ثقافيه للتعامل مع ألم أسفل الظهر المزمن قد تساعد هذه الفئه من المرضى على مساعدة أنفسهم وليصبحوا أكثر نشاطا. لذلك أردنا أن نجرب هذا البرنامج لمعرفة إذا ما كان مناسب للمرضى البحرينيين.

ما هو المتوقع مني إذا إشتركت؟

وسوف تجري الدراسة على مدى عدة أجزاء. وسيتم تقييمك قبل بدايه البرنامج. ثم سنطلب منك حضور البرنامج الثقافي للتاعمل مع الألم في مجمع السلمانيه الطبي (قسم العلاج الطبيعي) لمده 3 أسابيع. بعد البرنامج الذي سوف يتم تقييمك فوراً، بعد 6 أسابيع و 3 أشهر و 6 أشهر من الانتهاء. جمع البيانات في 3 و 6 شهر سساعدنا على الحكم على فعاليه البرنامج في المدى الطويل. تستطيع الإنسحاب من الدراسة في أي وقت دون الحاجة للتفسير. وليس هناك حاجة للتحضير للبرنامج، نريد فقط جزء من وقتك.

ماذا يتضمن "البرنامج الثقافي للتعامل مع ألم أسفل الظهر المزمن بقيادة أخصائي العلاج الطبيعي"؟

<u>هدف البرنامج:</u>

يهدف البرنامج إلى التقليل من العصبيه والمزاع المتعكر الذي يصاحب الألم، والتغير من المعتقدات الخاطئه. تشمل هذه المعتقدات: مراعاة الألم وبعض الأمور الشخصيه، الخوف من الحركه والإصابات الجديده، تقويه الجسد وزياده الأنشطه الحيويه في المنزل وغيرها، وتمكن المريض على مكافحة فترات الألم المبرحه.

محتوى البرنامج:

سيعقد البرنامج على مدى 3 جلسات في الإسبوع (لمده 60 دقيقه) على مجرى 3 أسابيع (مجموعها 9 جلسات). سوف تتضمن كل من هذه الجلسات محضرات مع مناقسات جماعيه لفتره 40 دقيقه وتمارين تقويه او استرخاء لمده 20 دقيقه. سيكون في كل مجموعه 12 مشترك كحد أقصى. وستكون الجلسات بقياده أخصائي أو أخصائيه علاج طبيعي ومساعده ألباحث الأول دانه مكي و أذا إحتاج الوضع سنستعين بمساعد علاج طبيعي. سنوفر كتيب لملخص البرانم وسيختوي الكتيب على المواضيع المطروحه والتمارين.

ماهي الإجراءات؟

تفاصيل الدراسة كالأتي:

1. إذا تناسبت حالتك مع شروط البرنامج فسيتم إختيارك من قبل أخصائي العلاج الطبيعي وسوف يعطيك هذه اللائحه لقراءة هذه المعلومات.
2. ستتصل بك رئيسه فريف البحث – دانه مكي – بعد يوم او يومين لمناقشة مشاركتك في هذا البرنامج.
3. بعدها، ستجتمع بك رئيسه فريف البحث وستعرض عليك المشاركه. وسيتم الطلب منك على توقيع إفاده تدل على موافقتم بالمشاركة بالبرنامج. وسيطلب منك تعبية إستبيان لجمع معلومات إجتماعية اساسيه، نسبة ألإعاقه الناتجه عن ألم أسفل الظهر، نسبة الألم/ اعتقاداتك عن ألم أسفل الظهر، وكيفية تعايشك معه وكيف يؤثر هذا الألم على مزاجك وحياتك اليوميه. ستستغرق هذه المعلومات 25 الى 35 دقيقه من وقتك.
4. بعدها ستشارك في مجموعه اللرجال او مجموعه النساء. نأمل ان يكون عدد المشاركين في كل مجموعه ما بين ال 6 إلى 12 مشارك أو مشاركه. سيعقد البرنامج على مدى 3 جلسات في الإسبوع (لمده 60 دقيقه) على مجرى 3 أسابيع (مجموعها 9 جلسات).
5. عند الأنتهاء من البرنامج سوف نطلب منك إعاده تعبية الإستبيانات.
6. سيتم الأتصال بك 9 الى 10 أسابيع بعد الإنتهاء من البرنامج للإتفاق على موعد المراجعه بعد 12 اسبوع (3 أشهر).
7. أخيراً، سيتم الأتصال بك 5 ½ أشهر بعد الإنتهاء من البرنامج للإتفاق على موعد المراجعه بعد 6 أشهر.

هل هناك أي سلبيات لمشاركتي؟

ليس هناك أي سلبيات متوقعة أو مخاطر من المشاركه.

هل سيتم الإحتفاظ بجميع المعلومات المعطاة بشكل سري؟

سيحتفظ فريق البحث بجميع البيانات المسجله بشكل سري. و سيقوم الباحثون كذلك بالإحتفاظ بماقيل خلال البرنامج و المناقشات بشكل سري. وعلينا التوضيح أننا سنطلب من المشاركين في البرنامج بالإحتفاض بالمنقشات وخصوصيات المشاركين الأخرين، وأفكارهم والمعلومات التي شاركوا بها.

سيتم تخزين الإستبيانات في منطقة مقفلة في الجامعه الأهليه في البحرين خلال فترة البحث. سوف نقوم بإستخدام أرقام سريه بدلاً من معلوماتك الشخصيه كي لا تشير الإستبيانات إليك، وستفقل هذه الأرقام السريه في أدراج مختلفه عن أدراج الإستبيانات ولن يستطيع أي أحد الإطلاع عليها سوأ رئيسه فريق البحث.

سنستخدم الأرقام السريه للمقابلات أيضاً. سيتم حفظ المقابلات المسجلة في منطقة مقفلة في جامعة كنجز كولج لندن.

لن نقوم بتزويد عيادتك بمعلومات عن مشاركتك ولن يتم ذكر إسمك في أي جزء من البحث. سنرمز إليك بالأرقام السريه. ولن يتم ذكر إسمك في أي جزء من البحث .وسيتم قراءة التحليل من قبل فريق البحث فقط في جامعة كنجز كولج لندن. قد يتم كتابة ونشر هذه التحليلات في البحوث الطبيعه العالميه او المحليه من دون الرمز اليك كفرد او مشارك معين. .

إذا قررت المشاركة في هذه الدراسة سيتم الطلب منك التوقيع على إفادة بالموافقة على مشاركتك، كما سنطلب منك توقيع الإفادة قبل بدء المقابلة وبيان موافقتك على التسجيل الصوتي. من الضروري توقيع الإفاده قبل الإشتراك. لا يلزمك توقيعك على هذه الإفادة لمواصلة المشاركة إلى نهاية ابرنامج. ستحصل على نسخة من إفادة الموافقة و سنقوم بالإحتفاظ بنسخة لسجلاتنا.

قبل المقابلات سنطلب منك توقيع إفاده للمشاركه في المقابلات والتسجيل الصوتي.

سنعتبر توقيعك على أي إفاده موافقه على المشاركه.

يمكنك الإنسحاب من المشاركة في اي وقت دون إعطاء أي سبب. قرارك بعدم المشاركة أو الإنسحاب لن يؤثر في الرعاية او المعامله التي تحصل عليها في العيادة التي تزورها. إذا أردت سحب معلوماتك الشخصيه وبيانات الإستبيانات فعليك إبلاغ فريق البحث قبل 3 ابريل 2015. . إذا أردت سحب معلومات المقابلات فعليك إبلاغ فريق البحث بعد 4 اسابيع من تاريخ المقابله.

للحصول على المزيد من المعلومات الرجاء عدم التردد في الإتصال على:

دانه محمد مكي البريد الكتروني: dana.maki@kcl.ac.uk الهاتف: 39469666

ماذا افعل في حالة حدوث مشكلة؟

إذا تسببت هذه الدراسة، بأي طريقة، بوضعك في موقف غير مفضل، يمكنك الإتصال بمشرف البحث د. دنكان كرتشلي بجامعة كنجز كولج لندن او د. ابراهيم رجب بالجامعه الأهليه في البحرين على التفاصيل المبينة ادناه:

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Appendix 20: Consent form for participating in the pain management programme

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

King's College Research Ethics No. BDM/13/14-45

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Study title:

Physiotherapist-led pain management programme for Low Back Pain in Bahrain: a feasibility study.

Consent to participation in 3 week Pain Management Programme and data collection at the beginning and follow-up sessions.

The study has been reviewed and approved the by the King's College London Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee (***BDM/ 13/ 14-45***). The person organising the research must explain the project to you before you agree to take part. If you have any questions regarding the Information Sheet or explanation, please ask the principle investigator before you make a decision on your participation. You will be given a copy of this Consent Form for your private records.

Please initial each statement to confirm your understanding:

I understand that if I choose to terminate my participation in this project, I can notify the researchers involved and withdraw from this study immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my data by 03 April 2015 (see Information Sheet) . ☐

I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998. ☐

I consent to taking part in this 3-week Pain Management Programme and data collection at the beginning and follow-up sessions (see Information Sheet). ☐

I understand that this intervention is group-based and the discussions in the groups are confidential and this must be maintained by all participants. ☐

Participant's Statement:

I _____

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed **Date**

Name of the Relative / witness **Signed** **Date**

Name of Person taking consent **Signed** **Date**

إفادة الموافقة على المقابلة مع التسجيل الصوتي

إفادة الموافقة للمشاركين في البحث الدراسي

الرجاء تعبئة هذه الإستمارة بعد قراءة لائحة المعلومات أو الاستماع إلى إيضاحات عن هذا البحث.

دراسة جدوى: برنامج ثقافي للتعامل مع ألم أسفل الظهر المزمن بقيادة أخصائي العلاج الطبيعي

إفادة الموافقه على المشاركه في برنامج ثقافي للتعامل مع ألم أسفل الظهر المزمن بقيادة أخصائي العلاج الطبيعي وجمع بيانات المريض قبل وبعد البرنامج

رقم موافقة لجنة المبادئ بجامعة كنجز كولج لندن: BDM/ 13/14-45

- شكرا لإبداء رغبتك بالمشاركة في هذا البحث ومن الواجب أن يقوم الباحث المسؤول عن البحث بشرح المشروع قبل أن توافق على المشاركة.

- إذا كانت لديك أي أسئلة بعد قرائك للائحة المعلومات واستماعك للشرح، الرجاء الاستفسار قبل موافقتك على المشاركة.

- سيتم إعطائك نسخة من إفادة الموافقة للإحتفاظ بها والرجوع إليها في أي وقت.

البيان	التوقيع
أعلم بأنه إذا قررت في أي وقت خلال البحث أن أتوقف عن المشاركه يمكنني إعلام الباحثين المنسقين والإنسحاب دون إبداء أي اسباب وأعلم أن بإمكاني سحب بياناتي حتى تاريخ 3 ابريل 2015.	
اعطي موافقتي لإستخدام معلوماتي للأسباب التي ذكرت لي وأعلم بأنه سيتم حفظ والتعامل مع المعلومات بالطريقه التي ذكرت في قانون حمايه المعلومات لعام 1998.	
أوافق على الإشتراك في هذه الدراسة (البرنامج الثقافي) وجمع بياناتي قبل وبعد البرنامج.	
أعلم أنني سأشارك ضمن مجموعة من المرضى ولذلك من الواجب الإحتفاظ بخصوصيات المرضى المشاركين.	

تصريح المشترك

أنا _____

اوافق بأن البحث المذكور أعلاه قد تم شرحه لي كما اوافق على المشاركة في هذه الدراسة. لقد قمت بقراءة كل من لائحة المعلومات عن البحث وأفهم كل مايتضمنه هذا البحث.

التوقيع_____ التاريخ_____

إسم الشخص الذي أخذ الإفادة_____

التوقيع_____ التاريخ_____

Appendix 21: Goal Attainment Scaling.

Goal			
-2 **Much less than expected**			
-1 **Somewhat less than expected**			
0 **Expected level**			
+1 **Somewhat more than expected**			
+2 **Much less than expected**			

Appendix 22: Treatment Credibility Scale

These questions refer to the treatment you have received since starting this study.

1. How logical did the treatment offered to you seem?

Not at all											Completely
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	

---

2. How successful do you think this treatment was in reducing the impact of pain on your life?

Not at all											Completely
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	

---

3. How confident would you be in recommending this treatment to a friend?

Not at all											Completely
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	

---

4. How interesting and engaging was the treatment overall?

Not at all											Completely
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	

---

5. How satisfied were you with the overall quality of the treatment?

Not at all											Completely
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	

Thank you. Please check you have not missed any pages.

مقياس مصداقيه العلاج

الرجاء الإجابه على هذه الأسئله بالنسبة إلى العلاج الذي تلقيته منذ بداية هذا البرنامج:

1.هل تعتقد أن كان للعلاج منطق؟

لا اوافق	0	1	2	3	4	5	6	7	8	9	10	اوافق تماماً

2.هل تستطيع تحديد نسبه نجاح هذا العلاج في تخفيظ نسبة الألم الذي تشعر به؟

لا اوافق	0	1	2	3	4	5	6	7	8	9	10	اوافق تماماً

3.هل تعتقد أنك ستنصح الأخرين بتجربه هذا العلاج؟

لا اوافق	0	1	2	3	4	5	6	7	8	9	10	اوافق تماماً

4.هل تستطيع تحديد درجة إهتمامك وانجذابك بهذا العلاج؟

لا اوافق	0	1	2	3	4	5	6	7	8	9	10	اوافق تماماً

5.بشكل عام، ما هو مستوى رضاك بالعلاج؟

لا اوافق	0	1	2	3	4	5	6	7	8	9	10	اوافق تماماً

Appendix 23: Pain management programme for low back pain

Session 1 – Introduction

Introduce the course, explaining the main aims and material to be covered in the following 3 weeks.

Patients are invited to detail the length of time they had experienced pain, what (if any) diagnosis or treatment had been given and the extent to which chronic pain affects their lives.

Previous experiences when they felt their pain was not believed or understood are acknowledged.

It is emphasised that the existence of their pain is not in question, but neither is it focused upon, as the emphasis is on function rather on than pain itself. At this point the aims of the course are explained, introducing the concept that the aim is not to reduce or eliminate pain, but to improve quality of life despite pain. The research evidence including the importance of returning to exercise and activity supporting this approach is presented.

Patients are introduced to the concept of the over – under activity cycle and shown how this inconsistent attempt to return to activity is detrimental to long-term increase in function. *Culturally-specific examples* are drawn from participants' experiences in point 1.

Housekeeping issues are raised (such as regular attendance and punctuality) and any questions answered.

Exercise - Introduction to circuits

Patients are shown the exercise circuit that they will follow over the next month.

Participants learn to set themselves manageable amounts to build upon rather than push themselves to their maximum, based upon Fordyce's paced approach to exercise.

The likelihood of increased pain after new exercise ('training pain') is explained, as a combination of muscle soreness and central nervous system hypersensitivity.

Patients are informed that experiencing pain does not, of itself, indicate damage.

They are invited to reflect the next day if they got the level 'right for them'.

Session 2 - Anatomy and common pathology

The session is aimed at helping patients understand basic anatomy relating to the musculoskeletal system.

The components of a typical synovial joint and how it functions is explained. Attention is given to specific structures (such as the spine) according to the questions from participants.

This session is particularly directed at dealing with common erroneous beliefs, myths and misconceptions regarding anatomy and pathology. The aim is to help the patient understand how their bodies are put together and to de-mystify common pain conditions with normal language and explanation. It also aims to recognise difficulties encountered when patients are either given no explanation or diagnosis for their pain or multiple diagnoses by different professionals. *Culturally-specific phrases* such as "eaten-up" and "broken" vertebrae are challenged.

The importance of movement to maintain healthy joints and tissues is explained with diagrams and information about joint structure and function.

Injury and healing processes are explained.

Common pain syndromes and diagnoses are presented.

Normal age related changes to the musculoskeletal system are explained and contrasted with often frightening medical labels given to patients for normal age-related changes.

Exercise

The circuit is repeated as in session one and patients are asked to reflect upon their previous effort and adjust accordingly, to prevent unnecessary overdoing. They are reminded of the concept of slowing down in order to make more consistent steady progress.

Session 3 - Pain and Damage

Patients are given an overview of modern ideas about pain, namely to introduce the biopsychosocial concept and also to understand the role of the central nervous system in the generation and maintenance of chronic pain. (Modern concepts of pain physiology to include the idea of neuroplasticity in the central nervous system where tissue damage may not be the main pain generator.)

They are introduced to the appropriate physiological, emotional, and physical explanations for the often confused and worrying aspects of having pain.

The differences between acute and chronic pain are explained. Acute pain is defined as pain that is occurs after injury while healing is taking place. Chronic pain is defined as pain that continues beyond completion of healing.

The healing times of different tissues are discussed. At 6 months it is recognised that healing will be complete. Currently understood mechanisms of pain are discussed in context of how the nervous system functions as a whole.

Different aspects of the pain model are explained by discussing phantom limb pain and cortical remapping, pain gate theory, and situations that demonstrate pain intensity may not always relate to the level of tissue damage.

Emotional and psychological factors in maintaining pain are discussed and how "fear-avoidance" can maintain a cycle of de-conditioning. The de-conditioning cycle and the benefits

of setting manageable baselines, and building up activity slowly are discussed. *Culturally-specific examples* are used the male or female groups respectively. These examples can be drawn from stories patients share. The key message of this session is that chronic pain, of itself, does not mean damage.

Exercise

The circuit is continued. Patients are encouraged to set their own manageable quotas, and advised *not* to use the old adage of 'let pain be your guide'.

The session ends with a relaxation session involving teaching diaphragmatic breathing and progressive muscular relaxation.

Session 4 – Posture, Pain and Movement

The aim of this session is to help patients understand the relationship between posture and pain. The aim is not to teach 'good' posture, in contrast to the principles taught on back school programmes. Patients are shown various postural types and asked to consider how it relates to their own posture.

The key principle explained is the importance of being able to move freely from different postures and positions.

Patients are asked to relate to their own experience how being in prolonged postures without moving is often uncomfortable. *Culturally-specific examples*: Females may wish to discuss common housework posture and men may wish to discuss manual jobs (if appropriate).

They are encouraged to see that frequent gentle movement in and out of different postures is often beneficial to pain levels compared with the adoption of one posture for prolonged periods.

The effects on the musculoskeletal system of adopting a fixed posture for prolonged periods is also discussed such as changes to muscle lengths and strength and effects on circulation.

This session also discusses patients' fear of movement. In particular, patients are encouraged to discuss what they consider 'safe' and what they consider 'damaging' movements or activities. Try to relate this to male and female *culturally-specific examples* if possible. This session often addresses patients' fears regarding specific activities such as bending and lifting and gives an ideal opportunity to challenge long held unhelpful fears and beliefs.

Exercise

Circuit continues

Session 5 – Managing Flare-Ups

The aim of this session is to improve participants' ability to self-manage 'flare-ups'. Flare-ups (exacerbations of symptoms) are discussed.

Questions regarding what defines a flare up, why they occur, and what maintains them are explored.

Flare-up as an indicator of further damage is discussed and challenged to support previous messages from previous sessions.

Patients are encouraged to discuss their experiences and how they have managed flare-ups in the past.

Patients are then directed to identify different ways to manage increased pain.

The physiotherapist facilitates participants to develop a list of new more active coping strategies to manage flare-ups in the future. These include, pacing techniques, exercise, and relaxation and avoiding bed rest, unnecessary panic, visiting the doctor. *Culturally-specific and valued examples* such as prayer positions, walking to and attending services mosques and other houses of worship, visiting neighbours, and playing with children/grandchildren are discussed.

Exercise – self-management of flare-up

The circuit is continued but patients are encouraged to think and plan ahead to envisage what exercises might be useful when dealing with an exacerbation of pain.

They are encouraged to see how they could adapt and continue with their exercises even though in increased pain, rather than give up altogether.

Session 6 – Goal setting and Changing Habits

Goal setting

The aim of this session is explained; to introduce goal planning as a strategy to inspire patients to overcome obstacles and work towards long and short term targets rather than focusing on the difficulties and negative aspects of living with a chronic pain condition.

The concept of SMART goals is explained.

Patients are given handouts to help them think as to what they would like for their personal goals and how to develop them as SMART goals.

Changing Habits

The aim of this session is explained; to encourage participants to identify positive and negative coping strategies and how they have changed past negative behaviours. Habits are identified as an important part of culture, identity and routine.

Good and bad habits are identified in general day-to-day life. Participants are invited to discuss a habit that they have overcome in the past, such as smoking.

Lists of strategies' are drawn according to how the group had overcome past habits. Patients are shown that they have a range of strategies such as distraction, reward, group support, and motivating thoughts.

The group are asked to create their own list of habits and responses to an acute injury such as a sprained ankle or broken leg. The therapist challenges the list by questioning which strategies are still in use for managing chronic pain. Patients are asked to identify reasons for

managing acute pain in the way that they had adopted and then challenged to explore if this approach remained logical and appropriate for chronic pain. The function of this is to reiterate that chronic pain is pain that continues past healing times and demonstrates to patients that past strategies may no longer be helpful.

Exercise – continue circuits

Monitor and encourage, as appropriate, paced increase in exercise volume.

Session 7 – Pain and Negativity and Group Planning Session

Pain and Negativity

The aim of this session is explained; to encourage participants to identify the link between thoughts, beliefs, feelings and actions. It is explained that continuous negative thoughts about a chronic pain condition can be very unhelpful in managing pain.

Patients are asked to come up with negative thoughts related to their pain, and they are written on the white board. They are re-assured that to have such worries is normal but also unhelpful if prolonged and never challenged. *Common cultural beliefs and negative thoughts about pain* are identified, discussed and challenged.

A group exercise identifying negative thoughts in a non-pain situation helps patients begin to understand that there may be different ways of looking at any situation. Patients' negative thoughts about their pain conditions are reasoned through with the therapist and, where appropriate, alternative thoughts, ideas and strategies for dealing with painful situations are introduced. It is explained that challenging thoughts is a new skill for most people and that it requires practice. They are encouraged to write down any thoughts and challenge them on paper during particularly difficult times.

Group Planning Session

After having been asked to go home and develop their own SMART goals, patients now discuss their efforts at goal planning in groups of twos and threes.

Patients feedback their efforts to the class.

Exercise –continue circuits

Monitor and encourage, as appropriate, paced increase in exercise volume.

Session 8 – Goals and Exercise Planning

This session aims to encourage participants to finalise their SMART GOALS which will be worked on for the next 6 weeks until the post course review session. Each patient is asked to describe their exercise plan for the next 6 weeks.

Goals regarding getting back to exercise and leisure are discussed.

Participants are encouraged to find enjoyable leisure activities or exercises to start doing, as well as the exercises from the class circuit. Patient are encouraged to choose *goals they can*

relate to. *Common cultural occasions, religious festivities and family dynamics* are reflected on to help patients identify barriers to their plan and how to overcome them.

Participants are encouraged to realise that they are only at the beginning of a long and continuous process. They are given positive reinforcement for already having made the initial changes and are encouraged to see how it may be possible to return to previously unthought-of of activities providing it is done in a paced and gradual way.

Exercise –continue circuits

Monitor and encourage, as appropriate, paced increase in exercise volume.

Session 9 – Group review + relaxation

There follows a general discussion on participants perception of the programme and any final questions.

A date for the follow up appointment is made.

Group relaxation

Participants' choice (20 mins)

Exercise –continue circuits

Continue circuits and final questions (20 mins)

Appendix 24: Publication 1

In **Spine:** Issue: Volume 39(25), 01 December 2014, p E1537–E1544

Cross-cultural Translation, Adaptation, and Psychometric Testing of the Roland-Morris Disability Questionnaire Into Modern Standard Arabic

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Relevant financial activities outside the submitted work: grants.

Abstract

Study Design. Cross-cultural translation, adaptation, and psychometric testing.

Objective. To cross-culturally translate and adapt the Roland-Morris Disability Questionnaire (RMDQ) into Modern Standard Arabic and examine its validity with Arabic-speaking patients with low back pain (LBP).

Summary of Background Data. The English RMDQ is valid, reliable, and commonly used to assess LBP disability in clinical practice and research. There is no valid and reliable version of the RMDQ in Modern Standard Arabic.

Methods. The RMDQ was forward translated and back translated. An expert committee of musculoskeletal physiotherapists reviewed the translation. Eight patients with LBP evaluated item-by-item comprehensibility. Ten patients piloted the RMDQ for overall comprehensibility and acceptability. Seventeen bilingual patients tested the agreement of the Arabic and English RMDQs. Two-hundred one patients completed the RMDQ and the visual analogue scale. Sixty-four patients were followed-up for test-retest reliability.

Results. Translation of most items was uncontroversial. The expert committee found the Arabic RMDQ clinically and culturally appropriate. They reviewed item 11, addressing bending and kneeling, because this has a clinical significance and cultural/religious implication regarding prayer positions. All patients reported that it was easy to understand and complete. The Arabic RMDQ had high overall agreement with the English RMDQ for the global score (intraclass correlation coefficient [ICC] = 0.925; 0.811–0.972). Kappa statistics showed good item-by-item agreement (none <=0.30). Mean (SD) RMDQ and visual analog scale scores of 201 patients were 10.53 (4.80) and 5.11 (2.28), respectively. The RMDQ had a low correlation against pain intensity (r = 0.259; P < 0.01). A Cronbach [alpha] of 0.729 showed high internal consistency. Test-retest reliability of the Arabic RMDQ was good (ICC = 0.900; 95% confidence interval, 0.753–0.951). Kappa statistics were high for 18 items and fair for 6.

Conclusion. The Arabic version of the RMDQ has good comprehensibility and acceptability, high internal consistency and reliability, low correlation against pain intensity, and good agreement with the English RMDQ. We recommend its use with Arabic-speaking patients with LBP.

Level of Evidence: 3

Low back pain (LBP) is a common source of musculoskeletal pain and disability. About 10% of patients with LBP experience activity limitations or restricted participation in daily life.1,2 The Roland-Morris Disability Questionnaire (RMDQ) is a condition-specific, patient-reported outcome commonly used to measure LBP disability in research and clinical practice.3–5 It was developed from the Sickness Impact Profile. Statements were chosen to cover multiple aspects of daily living and the phrase “because of my back” was added to each statement to specify that the limitation described was due to back problems.6 The English RMDQ (EnRMDQ) has adequate reliability, validity, and responsiveness.6–8 In addition, it is simple to understand and complete; therefore, guidelines have recommended its use with patients with LBP.9,10

The RMDQ has been cross-culturally translated and adapted to many cultures and languages.3,11–16 To the authors' knowledge, there is no version of the RMDQ in Modern Standard Arabic. Modern Standard Arabic (Arabic) is the modern form of literary Arabic and used in official written documents, the media, and public speaking in Middle East and North Africa.17,18 Translating and adapting a pre-existing valid and reliable outcome measure into Arabic would improve the assessment of self-reported LBP disability for Arabic-speaking patients and allow standardization of data collection across different countries and languages..3,13,19,20 The aims of this study were to cross-culturally translate and adapt the RMDQ into Arabic and to examine its validity and reliability for measuring disability associated with LBP in Arabic-speaking patients.

MATERIALS AND METHODS

Study Overview

The EnRMDQ was cross-culturally translated, adapted, and piloted by Arabic-speaking patients with LBP as recommended by Beaton *et al*.21 (Figure 1). The Arabic version (ArRMDQ) then underwent a validation study to determine its psychometric properties.

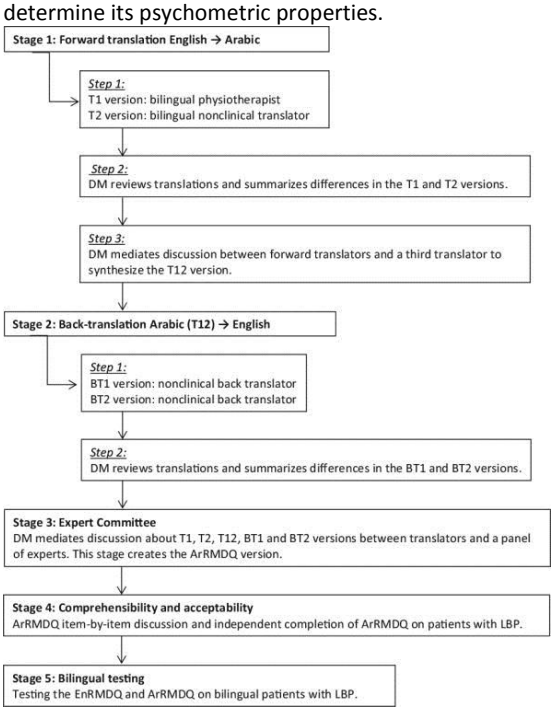

Figure 1. Cross-cultural translation and adaptation process. ArRMDQ indicates Arabic Roland-Morris Disability Questionnaire; EnRMDQ, English Roland-Morris Disability Questionnaire; LBP, low back pain.

Cross-cultural Translation and Adaptation

Translation

The EnRMDQ was forward translated from the original to the target language (Arabic) by a bilingual physiotherapist and a translator of nonclinical background to produce versions T1 and T2, respectively. Discussions between the forward translators were coordinated by the first author (D.M.) who is bilingual in English and Arabic to produce one Arabic version (T12). In the case of disagreements between T1 and T2 translators, a third translator of a nonclinical background was consulted. The T12 version was back translated from Arabic to English by 2 nonclinical translators, producing versions BT1 and BT2.

The T1, T2, T12, BT1, and BT2 versions were discussed by an expert committee of 3 clinical and 2 academic physiotherapists and included 2 translators and the first author (D.M.). The main purpose of the expert committee was cultural adaptation.21 The ArRMDQ was produced after recommendations from the panel.

Participants

Patients aged 18 years or older with back pain, with or without leg symptoms lasting for more than 3 months, were recruited from 4 outpatient physiotherapy sites in Bahrain. Reasons for exclusion were a diagnosis of inflammatory disease, spinal fractures, or recent surgery (<1 yr ago), or pregnancy. Ethical approval was granted from the Ministry of Health (Bahrain) and King's College London (UK).

Comprehensibility and Acceptability

Participants described their understanding of each item on the ArRMDQ. In addition, patients completed the

ArRMDQ in a clinical setting and commented on their experience.

Bilingual Testing

Bilingual participants completed the EnRMDQ and the ArRMDQ on the same day. The ArRMDQ had items in random order to minimize a recall effect.11,22Participants were randomly assigned to complete the EnRMDQ and then the ArRMDQ, or vice versa.

Psychometric Properties

Participants completed the ArRMDQ, visual analogue scale (VAS)23 for pain intensity, and sociodemographic information questionnaire. The participants were followed up 7 days later to repeat the outcome measures. This test-retest method was used to measure the short-term reliability of the ArRMDQ.

As there is no valid and reliable "gold standard" measure designed to evaluate self-reported LBP disability in Arabic, validity was examined by assessing construct validity. Construct validity is assessed by determining whether an outcome measure correlates appreciably with dimensions it is postulated to measure.14,24,25The RMDQ intends to assess LBP disability in terms of pain-related limitations and disabilities, so it was measured against one of the dimensions it postulates to measure—pain intensity (VAS). The Pearson correlation coefficient was used to determine the Arabic RMDQ's construct validity against the VAS. Previous studies show that the RMDQ correlates moderately correlate to pain intensity 11,12,14,26; therefore, a moderate association (of $r >= 0.30$) is expected between pain and disability.

Data Analyses

The agreement of the Arabic translation to the English version and short-term test-retest reliability of the ArRMDQ was tested by kappa statistics of agreement for item-by-item analysis and intraclass correlation coefficient ($ICC_{2,1}$) for the global score. On the basis of previous test-retest reliability testing of the RMDQ,3 a sample size calculation estimated that 57 participants would detect an approximate value of ICC of 0.85 to 0.95 with 95% confidence interval (CI). Internal consistency using the Cronbach [alpha] was used to measure the internal association of the items to the total score in an outcome measure. The Cronbach [alpha] for if-item-deleted assessed the individual items contribution toward internal consistency and redundancy.

Kappa statistic and ICC values of 0.80 or more were considered high, 0.60 to 0.80 to be acceptable, 0.41 to 0.6 moderate agreement, and 0.21 to 0.4 fair agreement.27 A high Cronbach [alpha] of 0.70 or more suggests that the items measure the same construct and support the construct validity.25,28 In addition, Bland-Altman plots were used to visually assess for agreement between the EnRMDQ and the ArRMDQ and for test-retest reliability of the ArRMDQ.29 SPSS 19.0 (IBM UK Ltd., Portsmouth, Hampshire, United Kingdom) was used for analyses.

RESULTS

Cross-cultural Translation and Adaptation

Translation

There were no major discrepancies between forward translators and back translators. T1 and T2 translators used different sentence structures for some items. They were settled by consultation with a third translator. "Because of my back" translates better grammatically into "because of my back pain" in Arabic. The 3 translators decided to use "because of my back" as in the original version to allow the reader to reflect on all back-related symptoms.

The expert committee found the ArRMDQ generally clear. There were discussions regarding items 6, 11, and 18. In item 6: *Because of my back, I lie down to rest more often*, the frequency of "often" was discussed for an appropriate Arabic equivalent. Item 11 addressed kneeling: *Because of my back, I try not to bend or kneel down.* This item had a cultural religious significance when it comes to performing prayer. The expert committee was careful not to contradict common lifting and handling advice. Item 18, *I sleep less well because of my back*, was difficult to translate because of colloquialism in "less well"; therefore, it was decided to use Arabic equivalent of "not well."

Comprehensibility and Acceptability

ArRMDQ items were read by 8 patients (2 males, 6 females) with mean (SD) age of 42.38 (8.28) to assess comprehensibility (Table 1). They generally found it very clear, and their comments did not indicate a problem in comprehension. They found the statements gave them specific tasks to consider and stimulated discussion points. For example, patients found it difficult to answer based on their activity "today" because their back pain fluctuated. They also found that they do things "differently" as opposed to (*i.e.*, "slowly" in item 9: *I get dressed more slowly than usual because of my back*) or break tasks down rather than avoid them (*i.e.*, item 4: *Because of my back I am not doing any of the jobs that I usually do around the house*). Ten patients independently completed the ArRMDQ in a clinical setting. Two of the 10 patients were illiterate and items were read verbatim to them by a clinician. None of the 10 patients reported any comprehension problems. No further changes made to the RMDQ after the comprehensibility and acceptability testing.

	Phases of the Cross-cultural Translation and Adaptation Procedure				
	Comprehensibility	Acceptability	Bilingual Testing	Validity	Reliability
n	8	10	17	201	64
Sex (M/F)	2/6	4/6	9/8	69/132	23/41
Age, yr					
Mean (SD)	42.38 (8.28)	39.7 (14.57)	36.47 (12.74)	44.55 (14.12)	43.11 (14.99)
Range	30–55	19–57	21–62	20–83	22–83
EnRMDQ					
Mean (SD)			7.41 (5.77)		
Range			0–22		
ArRMDQ					
Mean (SD)		6.70 (5.03)	6.88 (5.67)	10.53 (4.80)	10.61 (5.08)
Range		1–14	0–23	2–24	2–19
ArRMDQ retest					
Mean (SD)					9.47 (4.52)
Range					1–17

ArRMDQ indicates Arabic Roland-Morris Disability Questionnaire (0–24 points); EnRMDQ, English Roland-Morris Disability Questionnaire (0–24 points); F, female; M, male.

TABLE 1. Participants' Characteristics Across the Different Stages of the Cross-cultural Translation and Adaptation Procedure

Bilingual Testing

Seventeen patients (9 males, 8 females), bilingual in English and Arabic, completed the EnRMDQ and the ArRMDQ. Mean (SD) scores for the EnRMDQ was 7.41 (5.77) and for the ArRMDQ was 6.88 (5.67). Agreement of the global score was good (ICC = 0.925; 95% CI, 0.811–0.972). Kappa statistics showed that the EnRMDQ and the ArRMDQ had high item-by-item agreement for 10 items, acceptable for 6 items, and the remaining 8 were of moderate to fair agreement ([kappa]= 0.301–0.549) (Table 2). The Bland-Altman plot (Figure 2) showed good reliability with a mean difference of 0.529 (+4.864, -4.334).

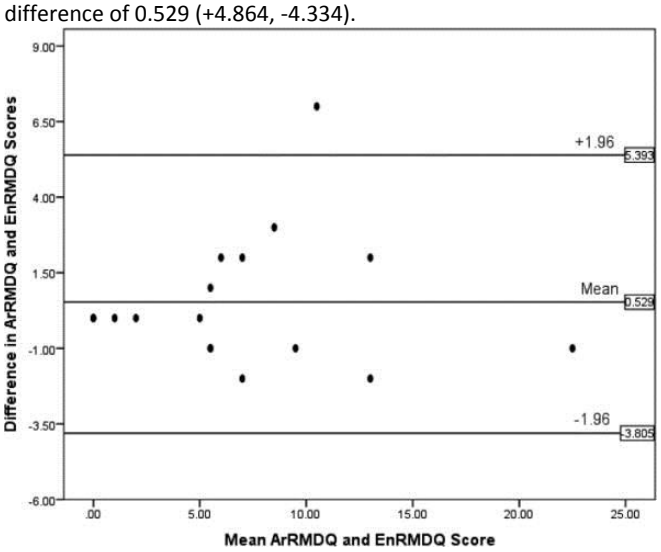

Figure 2. Bland-Altman plot for bilingual testing of the RMDQ: mean plotted against difference. ArRMDQ indicates Arabic Roland-Morris Disability Questionnaire; EnRMDQ, English Roland-Morris Disability Questionnaire.

Agreement of Global Score	
ICC	0.925
95% CI	0.811–0.972
Item-by-Item agreement	
Item	**κ**
1	1.000
2	1.000
3	0.628
4	0.549
5	0.463
6	0.648
7	0.549
8	0.638
9	0.850
10	0.742
11	0.764
12	0.850
13	0.303
14	1.000
15	1.000
16	1.000
17	0.549
18	0.866
19	0.938
20	0.301
21	0.534
22	0.717
23	0.876
24	0.463

ArRMDQ indicates Arabic Roland-Morris Disability Questionnaire; CI, confidence interval; EnRMDQ, English Roland-Morris Disability Questionnaire; ICC, intraclass correlation; κ, kappa statistic.

TABLE 2. Global and Item-by-item Agreement of the EnRMDQ *Versus* ArRMDQ

Psychometric Properties

Validity

A total of 201 participants completed the ArRMDQ and the VAS. Their mean (SD) scores for the ArRMDQ was 10.53 (4.80) and for the VAS was 5.11 (2.28). The ArRMDQ and the VAS had a low correlation (r= 0.259; P< 0.01).

Reliability

The ArRMDQ had high internal consistency ([alpha]= 0.729). Internal consistency score if-item-deleted showed that the removal of items 2 or 19 could increase the score to 0.737 (Table 3). Sixty-four patients were followed up 7 days later to assess the short-term reliability of the ArRMDQ. Test-retest reliability showed a high ICC value of 0.900 (95% CI, 0.753–0.951). The Bland-Altman plot showed good agreement (Figure 3). The mean difference was 1.1406 (+4.817, -3.676). Kappa statistics showed that 18 items of the ArRMDQ had acceptable agreement ([kappa]= 0.608–0.799). Six items (4, 17–19, 21, 23) had moderate agreement ([kappa]= 0.411–0.590). Table 3 provides a summary of the psychometric properties of the ArRMDQ.

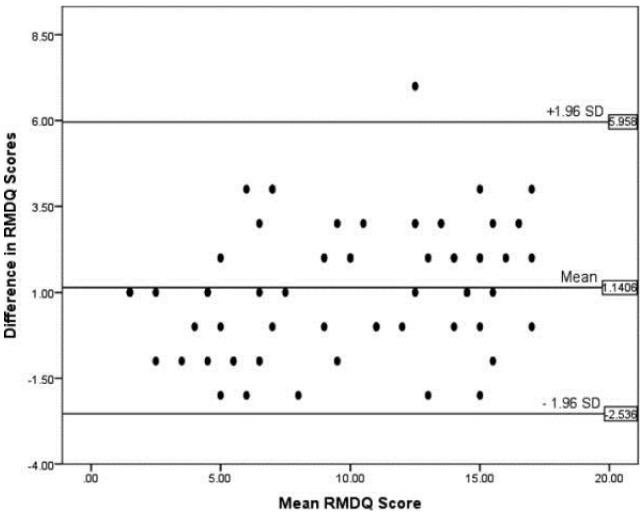

Figure 3. Bland Altman plot for test-retest reliability of the ArRMDQ: mean plotted against difference. ArRMDQ indicates Arabic Roland-Morris Disability Questionnaire; EnRMDQ, English Roland-Morris Disability Questionnaire.

	Reliability	Validity
	Test Retest Agreement (ICC; 95% CI)	Internal Consistency α
Global score	0.900; 0.753–0.951	0.729
Item-by-Item	Test Retest Agreement (κ)	Internal Consistency if Item Deleted (α)
1	0.749	0.718
2	0.618	0.737
3	0.724	0.707
4	0.590	0.717
5	0.680	0.726
6	0.656	0.728
7	0.865	0.727
8	0.711	0.711
9	0.608	0.713
10	0.649	0.721
11	0.630	0.719
12	0.729	0.721
13	0.678	0.722
14	0.666	0.723
15	0.699	0.724
16	0.799	0.716
17	0.554	0.711
18	0.545	0.725
19	0.581	0.737
20	0.661	0.713
21	0.561	0.725
22	0.560	0.722
23	0.411	0.711
24	0.734	0.718

ArRMDQ indicates Arabic Roland-Morris Disability Questionnaire; CI, confidence interval; ICC, intraclass correlation; κ, Kappa statistic; α, Cronbach α.

TABLE 3. Psychometric Properties of the ArRMDQ

DISCUSSION

The EnRMDQ was not difficult to translate to Arabic. The study showed the ArRMDQ is comprehensible and acceptable by Arabic-speaking and bilingual English and Arabic-speaking patients. The ArRMDQ had good agreement with the EnRMDQ, high short-term test-retest reliability, high internal consistency, and acceptable item-by-item agreement for most of the items.

There were very few disagreements between the translators. Similar findings were reported during the development of the Greek 30 and the simplified Chinese31 RMDQs. In the case of the ArRMDQ, discrepancies

between the translators were mainly related to grammatical sentence structure. The forward translators decided to retain “Because of my back” to preserve the intention of the original RMDQ to determine disability due to all back symptoms and not just pain.6

The expert committee found the ArRMDQ clear; however, they adapted items 11 and 18 to suit the clinical and cultural environment. The main purpose of the expert committee is adaptation.21 Therefore, they also amended colloquial phrases to suit the targeted patient population. Other translations have also had to amend colloquial phrases to maintain equivalence.20 Consensus on changes was not difficult to reach, similar to other translation experiences.13,32

Previous RMDQ cross-cultural translation and adaptation studies reported good comprehensibility and acceptability for different patients of different cultures, and this was also true for the ArRMDQ.13,26,30,33 The 8 patients participating in the item-by-item comprehension reported no comprehension problems. On the contrary, some expressed satisfaction because the ArRMDQ addressed topics not always discussed with the clinicians and prompted further discussion with the researcher. One patient thought that it would be interesting to use it as a treatment outcome measure.

None of the patients independently completing the ArRMDQ in a clinical setting reported any problems with comprehension. They found it quick and easy to complete. Illiterate patients found it easy to understand when read verbatim, as in other translations.26,31,34 Previous studies also found the RMDQ easy to administer, with few misunderstandings or declining participation, or requiring major adjustments.11,13,20,26,30,33 The simplified Chinese 31 and Persian 15versions found missing data for the Oswestry Disability Index (ODI) when compared with the RMDQ particularly in the Sex Life subscale, which the RMDQ does not contain. The ODI was adapted to Tunisian Arabic. Patients did not find the Sex Life subscale acceptable, and the authors removed it.35 Patients of more conservative cultures might not be comfortable with such topics.31,36 Thus, the RMDQ may be more culturally appropriate than the ODI in these cultures. In addition, the present study did not correlate the ArRMDQ against the ODI because of the aforementioned reasons and dialect.

To the authors' knowledge, this is the first study to assess the agreement of the cross-culturally adapted and translated RMDQ with the original as recommended by Beaton *et al*.21 There was high global agreement (ICC = 0.925; 95% CI, 0.811–0.972) and most item-by-item statistics between the EnRMDQ and the ArRMDQ. The mean difference at 0.529 is close to zero, indicating only slight differences between the first test and the retest.20 The limits of agreement are within the estimates of minimal clinically important difference of 4 to 5,8,37 therefore showing good agreement. A small sample was used to assess this aspect of the cross-cultural procedure because of the difficulty of recruiting bilingual patients with LBP meeting the eligibility criteria. Regardless, the results give an insight into the agreement of the ArRMDQ with the EnRMDQ.

The ArRMDQ had good psychometric properties that were similar to other versions. The ArRMDQ demonstrated good reliability. Most of the items of the ArRMDQ had good item-by-item agreement, comparable with other versions: Moroccan 14 and Hong Kong Chinese.38 The ArRMDQ had good overall agreement. The ICC value of 0.900 (95% CI, 0.753–0.951) is similar to the EnRMDQ 0.91 6 and within the range reported in the literature for other versions of the RMDQ ranging from 0.83 for the Norwegian RMDQ 33 to 0.95 of the Brazilian-Portuguese RMDQ.39 The Bland-Altman plot had limits of agreement (+4.817, -3.676) that are within the levels of minimal clinically important difference of 4 to 5 when the mean (SD) of the ArRMDQ of 10.53 (4.80) is taken into account showing good short-term repeatability.8,37

Overall, the ArRMDQ had a good validity. It had a high Cronbach [alpha] of 0.729. It was lower than that reported for the EnRMDQ, between 0.84 and 0.93,9and other RMDQ versions, between 0.81 20 and 0.94.26,33,40 The ArRMDQ had a lower correlation to pain intensity (r= 0.259; P< 0.01) than previous versions. A moderate association (of r>= 0.30) was expected between pain and disability as seen from other Arabic patients with LBP lasting more than 3 months (Moroccan 0.32 14 and Tunisian 0.33 26). The exclusion of patients with less than 3 months of pain could have contributed to the lower correlation value. Higher correlations were seen in studies that included patients with both acute and chronic LBP between the RMDQ and the VAS 31 and other self-report measures for pain.30,39 Both lower internal consistency and low correlation coefficient of the ArRMDQ could be explained by the relevance of some RMDQ items. For example, it is not common for individuals of a conservative Islamic culture to accept help when dressing 36 (item 19, *Because of my back pain, I get dressed with help from someone else*). The [alpha] score would be slightly higher at 0.737 if item 19 was deleted. It was retained to maintain the standardization of the tool and because the [alpha] value was within recommended internal consistency values of 0.70 to 0.90.9

One limitation of this study was that ArRMDQ's construct validity was assessed against only one dimension that it postulates to measure (pain intensity) and was found to have a low correlation. We recommend that future studies measure its association with other constructs, such as the Bodily Pain or Physical Functioning subscales of the Short-Form (36) Health Survey (SF-36) or other scores measuring function 16,20,33 in Arabic-speaking patients. In addition, the responsiveness of the ArRMDQ is yet to be explored.

In conclusion, the ArRMDQ has good comprehensibility and acceptability, high internal consistency and reliability in patients with LBP, and good agreement with the EnRMDQ. Validity testing showed that the ArRMDQ had a low correlation to its pain intensity construct in this population. Overall, the psychometric properties are acceptable and comparable with other versions of the RMDQ. The creation of a Modern Standard Arabic version of the RMDQ could be useful across the Middle East and North African region or countries with Arabic-speaking migrants. The ArRMDQ

could be used clinically as an outcome measure or for further research.

Key Points

* Self-report measures are commonly used to assess outcomes in clinical practice and research. The RMDQ is a valid and reliable tool for measuring disability associated with LBP.

* The RMDQ was cross-culturally translated into and adapted to Modern Standard Arabic (ArRMDQ) by 3 forward and back translators and an expert committee.

* The ArRMDQ was tested for comprehensibility, acceptability, agreement with the EnRMDQ, reliability, and validity.

* The ArRMDQ has good comprehensibility and acceptability, high internal consistency and short-term reliability, low correlation against pain intensity, and good agreement with the EnRMDQ.

* The ArRMDQ is recommended for use with Arabic-speaking patients with LBP to assess for clinical or research outcomes.

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Key words: low back pain; disability; self-report; Roland Morris Disability Questionnaire; Arabic; VAS; validity; reliability; agreement; culture

Appendix 25: Publication 2

Accepted by Disability and Rehabilitation in January 2016.

Article title: Translation, cross-cultural adaptation and psychometric properties of the Back Beliefs Questionnaire in Modern Standard Arabic.

Author(s): Dana Maki, Ebrahim Rajab, Paul J. Watson, and Duncan J. Critchley

Abstract

Purpose To translate and cross-culturally adapt the Back Beliefs Questionnaire (BBQ) into Modern Standard Arabic and examine its validity, acceptability and reliability in Arabic-speaking patients with LBP.

Method The BBQ was forward, back-translated and reviewed by an expert committee. Seventeen bilingual patients completed Arabic and English BBQs. LBP patients (n=199) completed the Arabic BBQ. Sixty-four repeated it a week later, and 151 completed the Arabic Fear-avoidance Beliefs Questionnaire (FABQ).

Results The expert committee followed advice from the developers to maintain Arabic equivalence of "back trouble(s)". Patients found the questionnaire comprehensible and acceptable. Agreement between of the English and Arabic versions of the BBQ was acceptable, ICC=0.65 (0.25-0.86). Most item-by-item agreement ranged from fair to moderate (K=0.12-0.54). Mean(SD) of BBQ, FABQ total, work and physical activity subscales were 25.31(6.13), 44.76(19.49), 21.17(10.10), and 13.95(6.65). The BBQ correlated with the FABQ at r=-0.33, work subscale r=-0.29 and physical activity r=-0.30 (all $p<0.01$). Cronbach's $\alpha=0.73$ indicated high internal consistency. Test re-test reliability was high, ICC= 0.80 (0.68–0.87). Item-by-item agreement ranged from fair to acceptable (K=0.31-0.66).

Conclusions The Arabic BBQ has good comprehensibility and acceptability, acceptable agreement with the English BBQ , high internal consistency and test re-test reliability. We recommend its use with Arabic-speaking LBP patient to determine their beliefs and attitudes about their back pain, as they have been shown to be important predictors of persistent LBP disability.

Main text

Introduction

Low back pain (LBP) is a common source of musculoskeletal pain and disability. About 10% of LBP patients continue to suffer with LBP in the long-term[1; 2]. Beliefs and attitudes about back pain, including poor recovery expectations, fear of pain, and work loss are important predictors of persistent LBP and its associated disability[3-5]. Therefore, strategies aimed at reducing LBP disability incorporate aims to change patients' beliefs[6-9]. The Back Beliefs Questionnaire (BBQ) is a condition specific, patient-reported outcome used to measure attitudes and beliefs concerning the future consequences of LBP, with regards to recovery and return to work[10]. The English BBQ (EnBBQ) consists of an inevitability subscale (9 items) and five statements used as distractors[10]. The scale has shown good reliability and validity[10; 11].

To the authors' knowledge, there is no version of the BBQ in Modern Standard Arabic. Modern Standard Arabic (Arabic) is the modern form of literary Arabic, used in official written documents, the media and public speaking in Middle East and North Africa (MENA)[12; 13]. Translating and adapting a pre-existing valid and reliable outcome measure into Arabic would improve the assessment of back beliefs in Arabic-speaking patients and allow standardisation of data collection in clinical and research settings across different countries and languages[14-17]. The aims of this study were to translate and cross-culturally adapt the BBQ into Arabic, and to examine its validity and reliability for measuring beliefs surrounding the inevitable consequences of LBP in Arabic-speaking patients.

Materials and Methods

Study overview

The EnBBQ was translated, cross-culturally adapted and piloted by Arabic-speaking patients with LBP as recommended by Beaton et al.[18] (Figure 1). Then the Arabic version (ArBBQ) underwent a validation study to determine its psychometric properties.

Insert Figure 1 about here

Translation and cross-cultural adaptation

Translation

The EnBBQ was forward translated from the original to the target language (Arabic) by a bilingual physiotherapist and a translator of non-clinical background to produce versions T1 and T2, respectively. Discussions between the forward translators were coordinated by author (DM) who is bilingual in English and Arabic to produce one Arabic version (T12). In the case of disagreements between T1 and T2 translators, a third translator of a non-clinical background was consulted. The T12 version was back-translated from Arabic to English by two non-clinical translators, producing versions BT1 and BT2.

The T1, T2, T12, BT1 and BT2 versions were discussed by an expert committee of three clinical and two academic physiotherapists who included the three translators and the author (DM). The main purpose of the expert committee was cultural adaptation[18]. The language was examined for semantic and idiomatic equivalence. Any described tasks, experiences and concepts were examined to insure for experiential and conceptual equivalence. The ArBBQ was produced following recommendations from the committee.

Participants

All participants throughout the study were recruited from four outpatient physiotherapy sites in Bahrain. Recruited patients were recruited to one aspect of the study. Patients had to native Arabic speakers, ≥18 years old with back pain, with or without leg symptoms lasting for more than three months. Reasons for exclusion were a diagnosis of inflammatory disease, spinal fractures or recent surgery (less than 1 year ago), or pregnancy. Participants fluent in English as a second language were allocated to the bilingual testing procedure. All participants gave informed consent. Ethical approval was obtained from the Ministry of Health, Bahrain (HM/SA/780/2013) and Biomedical Sciences, Dentistry, Medicine and Natural & Mathematical Sciences Research Ethics Subcommittee, King's College London (BDM/12/13-36).

Comprehensibility and acceptability

A group of participants were invited to verbally describe their understanding of each item on the ArBBQ. Additionally, participants completed the ArBBQ in a clinical setting and commented on their experience.

Bilingual testing

Bilingual patients were randomly assigned to complete the EnBBQ then ArBBQ, or vice versa, on the same day. The ArBBQ had items in random order to minimize a recall effect[19; 20].

Psychometric properties

Participants completed the ArBBQ, Arabic version of the Fear-avoidance Beliefs Questionnaire (FABQ, includes work (FABQ-w) and physical activity (FABQ-pa) subscales)[21], and socio-demographic information questionnaires. They were followed-up 7 days later to repeat the ArBBQ. This test re-test method was used to measure the short-term reliability of the ArBBQ.

Construct validity, determining whether an outcome measure correlates appreciably with dimensions it is postulated to measure[21-23], was used to examine the ArBBQ's validity. The BBQ assesses back pain-related beliefs and the FABQ subscales measure two of the dimensions the ArBBQ postulates to measure: (1) pain beliefs and work (FABQ-w), and (2) pain beliefs and physical activity (FABQ-pa). Pearson's correlation coefficients were used to determine the association of the ArBBQ to FABQ subscales. We expected to find low ($r \leq -0.30$) to moderate ($r = -0.30$ to -0.60) inverse correlations between FABQ, and its subscales to BBQ based on a previous study showing an inverse low to moderate correlation to the physical activity and work subscales of the FABQ respectively [11].

Data analyses

All BBQ scores (EnBBQ and ArBBQ) refer to the inevitability subscale of the BBQ calculated by reversing and summing 9 inevitability items (1, 2, 3, 6, 8, 10, 12, 13, and 14) and excluding distractor items. Thus participants can score between 9-45 points. A low score indicates higher levels of negative back-related beliefs. The agreement of the scores, both at the bilingual testing stage and short-term test re-test reliability of the ArBBQ, were calculated using intra-class correlation coefficient (ICC 2,1) and Bland-Altman plots[24]. Based on previous test re-test reliability testing of the English and Simplified Chinese BBQ (ICC= 0.87 and 0.85 respectively)[10; 11], we estimated 57 participants would detect an approximate value of ICC=0.85–0.95 at 95% confidence. Internal consistency using Cronbach's alpha was used to measure the internal association of the inevitability items only to the score. Cronbach's alpha if-item-deleted assessed the individual inevitability items' contribution towards internal consistency and redundancy.

The item-by-item agreement (including distractors) of the Arabic translation to the English version and short-term test re-test reliability, was tested using a 3x3 linear weighted Kappa statistics. The 3x3 linear weighted Kappa statistic was calculated to assume that there is no clinically important difference of 1 point in either direction of the scale, therefore it was weighted at 0.5 agreements (partial agreement), and no agreement at all ≥2 points in either direction of the scale and was weighted as 0 agreement (no agreement).

Kappa statistic and ICC values of ≥0.80 were considered high, 0.60–0.80 to be acceptable, 0.41–0.6 moderate agreement and 0.21–0.4 fair agreement [25]. A high Cronbach's alpha of ≥0.70 suggests that the items measure the same construct and support the construct validity[23; 26]. SPSS 19.0 (IBM UK Ltd) was used for analyses.

Results

Translation and cross-cultural adaptation

Translation

There were no major differences between forward and back-translations. T1 and T2 translators used different sentence structures for some items. T1 and T2 differed in their choice of phrase for "bad back" and "back troubles". After consultation with a third translator, T1 and T2 translators decided to use "back trouble(s)" as in the original version to allow the reader to reflect on all back-related symptoms. Item 5: A bad back should be exercised was the only phrase in the T12 version that used a different phrase, "fatigued back". The coordinator (DM) contacted the developers of the BBQ to clarify their choice of phrases and presented it with the T12 version to the expert committee. The developers suggested we use a phrase that reflects all back troubles.

The expert committee found the ArBBQ generally clear. They reviewed the title to ensure that "belief" was correctly conjugated. (The Arabic words for "beliefs" and "religious beliefs" have the same root word but are conjugated differently). They used "back pain" instead of "back" in the title because "back" and "noon" are homographs in Arabic. The expert committee decided to use the phrase "back trouble(s)" or "troubles of the back" throughout the text, including item 5, following consultation with the original developers. Other minor grammatical changes were made to improve the sentence structure.

Insert Table 1 about here

Comprehensibility and acceptability

ArBBQ items were read by eight patients (2 males, 6 females) with mean(SD) age 42.38(8.28) to assess comprehensibility (Table 1: Patient characteristics). Five participants found it clear. Three different participants expressed confusion and concern whether to agree to item 2: Back trouble will eventually stop you from working, item 3: Back trouble means periods of pain for the rest of one's life, and item 10: Back trouble means long periods of time off work. One of the 3 participants commenting on the ArBBQ mentioned that beliefs regarding items 1, 2, 4, 6, and 8 were dependant on patients' faith in God. Another asked to clarify "alternative treatments" in item 9.
Ten patients completed the ArBBQ in a clinical setting. Two of them were illiterate. Items were read verbatim to them by a clinician. Both of the illiterate participants and 2 others asked about "alternative treatments" in item 9. None reported any other comprehension problems. No further changes made to the ArBBQ after the comprehensibility and acceptability testing.

Insert Table 2 about here

Bilingual testing

Seventeen patients (9 males, 8 females) bilingual in English and Arabic completed the EnBBQ and ArBBQ. Mean(SD) EnBBQ was 25.82(5.60) and ArBBQ was 26.41(4.50). Agreement of the scores was acceptable at ICC=0.64 (95% CI 0.25–0.86). Kappa statistics showed the EnBBQ and ArBBQ had fair to moderate agreement (K=0.12–0.54) with the exception of item 10: Back trouble means long periods of time off work (acceptable agreement K=0.60) and item 2: Back trouble will eventually stop you from working. (no agreement K=-0.08) (Table 2). The Bland-Altman Plot (Figure 2) showed a mean difference of -0.59(+9.12,-9.12).

Insert Figure 2 about here

Psychometric properties

Reliability

Short-term reliability was high ICC= 0.80 (95% CI 0.68–0.87), from 64 participants (Table 1) tested at baseline and followed-up 7 days later. The Bland-Altman plot (Figure 3) showed the mean difference at -1.03(+12.63,-8.00). Kappa statistics showed two items (1 and 12) had acceptable agreement (K=0.62, 0.66), ten items (2-9, 13, 14) had moderate agreement (K= 0.40–0.58) and two items (10 and 11) had fair agreement (0.31). Table 3 has a summary of the psychometric properties of the ArBBQ.

Insert Figure 3 about here

Validity

The ArBBQ had high internal consistency (α= 0.73) from 199 participants completing the ArBBQ (Table 1). Internal consistency score if-item-deleted showed that the deletion of items 1 and 13 would increase the score to 0.74 and 0.77 respectively (Table 3). The ArBBQ and FABQ were completed by 151 participants (Table 1). Their mean(SD) ArBBQ= 25.31(6.13), FABQ=44.76(19.49), FABQ-w=21.17(10.10), and FABQ-pa=13.95(6.65). The ArBBQ correlated with the FABQ at r= -0.33(p< 0.01) FABQ-w r= -0.29 and FABQ-pa r= -0.30(p< 0.01).

Insert Table 3 about here

Discussion

This study showed the ArBBQ is comprehensible and acceptable to Arabic-speaking patients. It had good agreement with the EnBBQ, short-term test re-test reliability and internal consistency. The ArBBQ had moderate item-by-item agreement for most of the items.

There were a few disagreements between the translators and with regards of their choice of terms to describe a “bad back” and “back troubles”. Testing of the Simplified Chinese version found similar difficulties with translating “back trouble” into a linguistically and culturally appropriate term[11] due to the colloquial nature of those phrases. Contact with the original developers, as recommended by the Beaton et al.[18] guidelines, reassured the expert committee to use the phrase “back trouble(s)” or “troubles of the back” throughout and preserve the intention of the original BBQ while maintaining semantic and idiomatic equivalence. Otherwise, the expert committee found the translation of tasks, experiences and concepts in ArBBQ clear and maintained experiential and conceptual equivalence.

Comments from the 5 of 8 patients participating in the item-by-item comprehension showed patients’ thoughts about some of beliefs illustrated in the items. The expert committee did not find them to indicate any comprehensibility and acceptability problems. They provided insight into patients’ beliefs that should be explored in future research and taken into consideration in clinical practice. For example, patients’ expressed confusion when rating their agreement with items 2, 3 and 10 which address long-term outcomes of LBP. Reasons for confusion could include; diversity of advice and prognosis received from healthcare professionals[27; 28], diversity of patients’ presentations and needs[27; 28], and lack of acceptance and hope that their condition would resolve[29-31]. One patient said some outcomes were dependant on faith in God, giving insight on how some patients in this Arabic culture cope with, or reflect on, chronic LBP[30]. Although such coping mechanisms predict poor outcomes in Western cultures[32-35], religious coping behaviours can provide meaning and promote acceptance, responsibility and hopefulness, which can reduce negative responses to chronic pain[31; 36; 37]. These ideas, under appropriate circumstances, can promote positive coping[31; 36; 38].

Three participants asked to explain the phrase “alternative treatments” in item 9. Patients were instructed to answer based on their understanding of what the phrase meant. Ambiguity over what constitutes as “alterative” treatment or therapies has been documented previously[39]. Patients were concerned whether Hijama (wet cupping), massages given by traditional masseurs, and Kayy (cautery) were included under that umbrella term. These treatments are common in the Arabian Gulf region[40; 41]. They are also occasionally performed by orthodox doctors, which blurs the line between “alternative” and “conventional” therapy if “alternative treatment” is defined as therapy given outside the context of orthodox hospital medicine[39; 42; 43]. The expert committee felt the selected Arabic phrase maintains conceptual equivalence with the English version and allows patients to decide what they believed was included under that umbrella term and its effectiveness in managing back trouble.
There was acceptable agreement between the English and Arabic BBQ scores ICC=0.64 (95% CI=0.25–0.86), however most item-by-item statistics between the EnBBQ and the ArBBQ were of fair to moderate agreement. The low Kappa statistic for item-by-item analyses could be due to the small sample size (n= 17). Item 2 was reviewed by the authors and expert committee and was found to be accurate, despite the no agreement shown by its Kappa value (K=-0.08). Regardless, the results describe the agreement of the ArBBQ with the EnBBQ. To the authors’ knowledge, this is the first study to assess the agreement of the cross-culturally adapted and translated BBQ with the original as recommended by Beaton et al.[18].

The ArBBQ had good psychometric properties, comparable to other versions of the BBQ. The ArBBQ had high test re-test reliability ICC=0.80 (0.68–0.87)[44]. Other versions of the BBQ had slightly higher ICC scores; EnBBQ 0.87[10], Simplified Chinese 0.88[11] and Traditional Chinese 0.85[45]. All the other versions included participants with no LBP, which could have biased the test re-test procedure.

Bland-Altman Plots were constructed to assess the agreement of the ArBBQ to EnBBQ, and the test re-test reliability of the ArBBQ. The difference between ArBBQ and EnBBQ against their mean (limits of agreement) showed a difference of ±9.12 points, and +12.63, -8.00 for test re-test reliability of the ArBBQ. Changes of 2-3 points in BBQ scores, smaller than our limits of agreement, have been reported as statistically significant differences following intervention[4; 8; 9; 46; 47] however a minimally clinically important difference (MCID) has not been calculated. When a MICD has not been established, differences of means between ‘known groups’ can be used as a proxy[48]. A 20 point difference in mean BBQ scores of ‘known groups’; individuals off work due to LBP and those still working, has been reported[10]. Although it is not an MCID, it could be used to interpret the observed limits of agreement. Therefore, our observed limits of agreement are probably acceptable because they are smaller than the differences between ‘known groups’. These findings support our results for both constructed Bland-Altman Plots showing acceptable English to Arabic agreement and short-term reliability testing of the ArBBQ. However, it is important to note that it is difficult to fully comment on these limits without additional testing of the responsiveness and MCID of the ArBBQ in its target population.

Further reliability testing showed that the ArBBQ had high internal consistency. We do not suggest the removal of items 1 and 13 because the ArBBQ had high internal consistency (≥0.70)[23; 26] with the inclusion of all 9 inevitability items.

Overall the ArBBQ had good construct validity when compared to the FABQ. The ArBBQ had a moderate inverse association to the overall FABQ score (r= -0.33), meaning the more positive a participant was the less likely they were to be fear-avoidant. The correlation between the ArBBQ and FABQ-pa was moderate, and low when compared to FABQ-w. It would have been expected for the ArBBQ to have a moderate association to FABQ-w since the BBQ assess attitudes and beliefs about the work-loss and absence. Other translated version of the BBQ found a higher association between the BBQ and FABQ-w subscale (r= -0.45 Simplified Chinese[11]) and low associations to FABQ-pa (r= -0.02 Traditional Chinese[45], and r= -0.19 Simplified Chinese[11]). There are a few reasons for these differences with both Chinese versions. Both Chinese studies included healthcare professionals, with or without LBP, in their samples whereas our study only included LBP patients, arguably making our findings more valid. Additionally, a large proportion of our sample were homemakers, therefore their interpretation of housework as work, chores or responsibilities on the outcome measures could have varied according to personal interpretation and cultural expectations[37].

Limitations

In addition to the aforementioned limitations, this study only measured the correlation between the ArBBQ and FABQ subscales, mainly due to the limited availability of validated self-report outcome measures in Arabic. We recommend future studies assess the ArBBQ against other dimensions it could be associated with such as disability[32; 49; 50]. Additionally, the responsiveness of the ArBBQ is yet to be explored in Arabic-speaking patients.

Conclusions

In conclusion, the ArBBQ had good comprehensibility and acceptability to LBP patients. The ArBBQ has good psychometric properties that are comparable with other versions of the BBQ. This Arabic version of the BBQ could be useful across the MENA region or in countries with Arabic-speaking migrants. The ArBBQ could be used clinically as an outcome measure or for further research exploring culture-specific attitudes and beliefs towards LBP.

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Declarations of interest

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Appendix 26: Abstracts and Conference Presentations

Oral Presentations

Cross-cultural translation, adaptation and psychometric properties of the Back Beliefs Questionnaire in Modern Standard Arabic. Maki, D., Rajab, E., Watson, P. J., Critchley, D. J. 1-4th May 2015. *World Confederation for Physical Therapy Congress 2015.* Singapore.

Determining the feasibility of a physiotherapist-led pain management programme for Arab patients with Low Back Pain in Bahrain. Maki, D., Rajab, E., Watson, P. J., Critchley, D. J. 1-4th May 2015. *World Confederation for Physical Therapy Congress 2015.* Singapore.

Factors associated with low back pain disability in non-Western cultures: a systematic review. Maki, D., Watson, P. J., Critchley, D. J. 1-4th May 2015. *World Confederation for Physical Therapy Congress 2015.* Singapore.

Persistent low back pain in Arab patients: an exploration of experiences, beliefs and expectations in Bahrain. Maki, D., Critchley, D. J., Watson, P. J., Lempp, H. 1-4th May 2015. *World Confederation for Physical Therapy Congress 2015.* Singapore.

Cross-cultural translation and adaptation of the Arabic Roland-Morris Disability Questionnaire. Maki, D., Rajab, E., Watson, P. & Critchley, D. 7 Sep 2013 *Proceedings World Confederation for Physical Therapy Congress 2013: The 6th Asia-Western Pacific Regional Congress of the World Confederation for Physical Therapy and The 12th International Congress of Asian Confederation for Physical Therapy.* Taiwan. *presentation won 3rd place in the Student's Oral Presentations category.

Poster Presentations

Long-term lower back pain in Arab patients: an exploration of experiences, beliefs and expectations in Bahrain. Maki, D., Critchley, D. J., Watson, P. J., Lempp, H. 28-30th Apr 2015. *Rheumatology 2015.* Liverpool, UK.

Determinants of self-reported disability in Arab Patients with Low Back Pain. Maki, D., Watson, P. & Critchley, D. 1 May 2014 *British Pain Society Annual Scientific Meeting April 2014.* Manchester, UK.